The Builder.

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A Note from Northampton.

ALTHORPE, or, as it is now called, Althorp, mentioned in the first part of our note,* is about five miles from Northampton. The House has little to recommend it from an architectural point of view, but contains a library of world-wide fame, and some 400 pictures, including fine specimens of the work of Titian, Vandyck, Janssens, Holbein, Sir Antonio More, Pourbus, Snyders, Kneller, Lely, Sir Joshua Reynolds, and Gainsborough. The number of the books here is estimated by Mr. Baker to be 33,000, and there is a further portion of the library in the town residence, Spencer House, St. James's. It is a treat at Althorp to look even at the backs of them. What real use is permitted of them we cannot say. It would be interesting, and not valueless, to learn what amount of actual benefit has been conferred on society, say during the last fifty years, by this wonderful collection of the results of man's learning and labour? The excuse made by "Charles Surface" for having sold the family library,—"For my part, I was always of a communicative disposition, so I thought it a shame to keep so much knowledge to myself;"—was really sounder than he thought it was. Of course we should be sorry to see such collections as this at Althorp dispersed, but glad enough to find them turned to greater account.

We have no intention to give a list of the pictures, or even to point out the best of them. The main thing to say is, that they well repay a journey. William, first Duke of Bedford, and George Digby, second Earl of Bristol, in one frame, is a very fine specimen of Vandyck's skill. His better known picture here of Dædalus and Icarus is to our mind less satisfactory. A powerful full-length, by Pourbus the younger, of one of the Dukes de Guise; Sarah, Duchess of Marlborough, by Kneller; Rubens, by Vandyck; a capital sketch by Rubens, representing David presenting a thank-offering to Jehovah on the return of the Ark of the Covenant; a portrait of Sir Antonio More, by himself; Sir Kenelm Digby, by Janssens; and a number of elegant female portraits by Sir Joshua Reynolds, are sure to be noticed by those who pass through the rooms. The younger Cornaro, by Titian, is another striking work.

There is a mystery, a pathos, in the colouring of Titian which is more often felt than understood. A very recent writer, whose book has scarcely left the binder's,† traces Titian's appreciation of the grandeur of Nature and the poetry of labour, his knowledge of those moments in Nature when her splendour is soul-subduing, to his early home amongst the Dolomite mountains of Cadore:—"Even the revels of a Bacchanal were rebuked by the tones of earth and sky; and it was as in the pensive twilight of some great day that princes, senators, and soldiers, were rendered to posterity."

How well Titian was known to appreciate nature is shown in one of Aretino's letters to him, wherein he describes himself as attracted by the splendours of a sunset while looking out of window at a boat-race. "There appeared in certain places a green azure, in others an azure green, composed according to the caprice of the Master of masters—Nature; so that," says he, "I called out two or three times 'O Titian, where art thou?'" Do we not find in such scenes the true source of Venetian art, so glowing and yet so subdued? A great master was *il Gran Tizian*. The circumstances of his death were sadly in contrast with his life. The centre of a delightful circle, including rank, beauty, and genius; the entertainer of a king, and pointed to by Michelangelo as the man alone worthy to be called a painter, he died at 99, in the midst of plague-stricken Venice, 1576, abandoned and alone,—his plate and pictures carried off before his eyes by ruffians. A law had been passed that during the visitation no person should be buried in the churches; but an exception was made in favour of Titian, and the church of the Frari has, in consequence, become a place to be visited by all lovers and students of art. We are rambling, however, from Althorp. A view of the Green Park in 1760, by Hogarth, should be looked at. It shows Spencer House, and the piece of water next Piccadilly, since got rid of. There was a report the other day, by the way, that Hogarth's house at Chiswick was to be pulled down. Fortunately this was erroneous; there is no such intention, we believe, just now. Something should be done to ensure its preservation.

Judging from the richness of the dress, the admirable picture of an old lady, now called "Rembrandt's Mother," by Rembrandt, more probably represents one of his wealthy sisters: and others have thought so before us. Amongst the earlier works is an admirably-painted triptych, or rather an altar-piece with doors; the centre part of which, popularly but erroneously called "St. Jerome studying Theology," shows the saint with an open book, and pointing to a skull, with the motto on a portion of the apartment, *Respice finem*. We have seen a duplicate of the picture elsewhere. Waagen, in his usual dogmatic style, attributes it to Bartholomew de Bruyn. A piece of encaustic painting found near Beneventum, and cut out in the presence of Georgiana Countess Dowager Spencer, by permission of Ferdinand, fourth King of Naples, in the year 1793, should not be passed over. There is a small picture attributed to Claude, which is much darker than the great majority of his works. It possesses considerable beauty. After all is said by adverse critics, Claude must still retain the character of a great landscape painter. "I remember," says Sir George Beaumont, in a letter now accidentally before us, "receiving a reprimand from Wilson, the painter, for finding fault with Claude, though I qualified my observation by saying what I really thought at the time, that Wilson was a much better painter himself. 'I'll tell you what,' said Wilson, 'all I know of the matter I learnt from Claude and Cuyp, the only people who ever could paint fine weather and Italian skies; and if you will study Claude well, and get acquainted with him, you will be of the same opinion. There is one picture of his (and I think he named the Doria Claude, with the Temple), which makes my heart ache. I shall never paint such a picture as that were I to live a thousand years.'" A very piquant portrait of the author of the "Faerie Queen" (what the author called "a continued allegory, or dark conceit") reminds the visitor of the probable connexion of the poet with the noble family of the Spencers; and if he inquire he will find little reason to doubt it. In dedications of some of his poems to three of the daughters of Sir John Spencer the relationship is referred to, and in another poem, in which various ladies are eulogised, he says:—

> "Ne lesse praiseworthie are the sisters three,
> The honor of the noble familie:
> Of which I meanest boast myself to be,
> And most that unto them I am so nie."

Why in modern times his name has been spelt with *s* instead of *c* is not obvious. On the poet's monument in Westminster Abbey (for though he died "from lack of bread," he has a stone there) his name is written like that of the owner of Althorp,—SPENCER. His epitaph (we have just now looked at it to be certain) reads thus:—"Heare lyes (expecting the second comminge of our Saviour Christ Iesus) the body of Edmond Spencer the prince of poets in his tyme whose divine spirrit needs noe othir witnesse then the works which he left behinde him."

When leaving the House and its rich contents, a piece of modern sculpture in the hall, a floating Sailor about to sink, attracts attention. If we mistake not, it is by one of our countrymen, now practising an adopted art in Florence, Captain Fuller. The expression of the face is remarkably good.

Brixworth, anciently Briclesworde and Brikelswerth, is about three miles farther on, from Northampton. Its characteristic feature, semicircular arches in the present outer walls of the nave formed by two concentric rings of so-called Roman bricks, with a flat course over each ring, will be remembered by all who have looked at illustrations of early architecture in England. They may also remember that it has a square tower at the west end, and a large staircase-turret built against the tower, with a rounded end westward. All these three features would seem to be of different dates, and all anterior to the Conquest. Good antiquaries have considered the nave to be actually Roman work, and may be right. Other good antiquaries deny this, viewing it as early Saxon work, the material being obtained from Roman buildings in the neighbourhood, and *they* may be right. Those who know the basilicas of Italy, those who believe that the pharos and church on Dover heights are of Roman work, will see no reason to deny at once the Roman parentage of the church at Brixworth, especially if seen now; for some of these arches have been rebuilt during the recent restoration, and look more Roman than ever, the bricks having been made to radiate truthfully, while in the original no attention had been paid to this, and the radii were all manner of ways. This is one of the misfortunes that attend restoration, however conscientiously conducted. We make no great complaint against those who conducted the work here; ancient parts are left exposed, and there seems to have been an anxious desire to do right. Modern exigencies must be met; but the question arises whether in the case of buildings of such age and national interest with respect to art-history as Brixworth, they should not be left alone, except to the extent of maintaining them, and other structures provided to fulfil their purpose.

The plan of Brixworth Church is Basilican. The nave is of two squares, and is 60 ft. long by 30 ft. wide. The chancel is one square, 30 ft. both ways. On each side of the nave, north and south, beyond the arches in question, was, not a continuous aisle, but a series of small apartments, or *cubicula*, five on each side, as excavations have shown, besides one on each side of the tower. In an upper story of the tower a three-light balustre window, with the arches formed of bricks, altogether of the type we call Saxon, has been formed in the wall next the nave, displacing part of an arch of bricks similar to those at the sides. The turret, again, built against the tower, is also pre-Norman; so that

* See p. 537, *ante*.

† Cadore, by Josiah Gilbert.

the extreme age of the nave is undoubted. Even if the nave were not built in the time of the Roman domination, it is work in the Roman manner carried on by the Britons or the Saxons. We have more, however, to say on this point, especially as illustrated by the tower of Earl's Barton Church, than we can get into the tail of an article, and so must break off again for a time.

THE GREAT COAL SUPPLY QUESTION.

IT appears that we are to have a reprieve. Not in our days, nor even in the days of our sons, or our sons' sons, is the evil of exhausted coal fields to come upon our country. A famine, to which the cotton famine would be as nothing—a dearth of our chief source of light, of heat, and of motive power, so far as those prime elements of civilization are now artificially produced—is declared, by the best authorities, to be far from imminent. Our annual consumption of 100,000,000 of tons of coal may continue, and may augment, for more years than we need care to reckon. The wolf which was declared to be at our door is now stated to be a very distant, if not an altogether mythical, beast of prey.

Our readers may remember the glance which we afforded them, now nearly two years ago, at the coal fields of the future. The very important question of the extent of our own sources of supply, and the probable duration of their enormous and increasing yield, has, since that time, been investigated with a minute care not unworthy of the occasion. We are not yet in possession of the report of the Commission. In fact, a sort of appeal has been made to our forbearance on this score; and it is urged that the Commissioners ought not, by any public expression of impatience, to be hurried into a premature and incomplete publication of the result of their labour.

We are happy to think that the matter is not so urgent as to call for the rejection of this plea. No practical evil is likely to result from the delay of a few weeks, more or less, in the completion of the inquiry. On the other hand, it is of extreme importance that the work of the Commission should be exhaustive of the subject; and that the report should present us, not with the vagaries of individual opinion, but with the undeniable result of all that is, or that can be, known on the subject at present. So practical an upshot would be such a welcome novelty among the reports of the Royal Commissions that have had to deal with any great engineering questions, that we should be loth to do anything to cause miscarriage, or to imperil the happy and timely delivery. To have the great question of coal supply removed from the province of opinion to that of scientific certitude, will be an achievement worthy of the best efforts of the miners, geologists, and statisticians, of our day.

The inquiry is divided into five several branches, respectively carried on by as many distinct sub-committees. The first of these relates to the limit which is placed on the productive value of our present coal-fields, by the mere condition of depth from the surface. In this respect the result of the present investigation can only be regarded as negative, or at least as provisional. The actual limit may be stated with more or less precision. The future limit can never be less remote. It may, on the contrary, be greatly extended. All improvements in our mechanical and chemical knowledge have a tendency to roll that limit further back, and to endow us with the power of penetrating yet deeper into the bowels of the earth. We may expect to learn from the report of, and from the evidence taken by, the Commission, how far increasing heat is a function of increasing depth below the level of the sea; and how far such an increase may be regarded as dependent on a general geognostic law, or how far it may be influenced by local conditions. We may also expect precise information as to the best and most reliable method of ventilation; and as to the effect of good ventilation in checking or eliminating the undue heat of deep subterranean workings. But as to the result of methods of ventilation yet untried,—of the artificial production of a low temperature, or rather of a chemical means of absorbing heat;—or as to improvements in the mechanical mode of extracting the rich mineral wealth of the coal-fields with the minimum amount of human labour,—the Report will have but little to tell us. Under this head, therefore, we may confidently hold that the facts will be better than the anticipations, and the future more satisfactory than the present.

It will be highly desirable that, in considering this important part of the theory of our coal supply, the investigation should not be limited to the question of temperature. Human safety is no less an economic element, as regards the cost of coal, than human comfort. When we are inquiring how far a deep seam may be accessible, the high temperature which obtains in its galleries being the great obstacle to its free working, let us not forget that liability to explosion increases, both with pressure and with temperature. The Commission cannot, with justice to this object, fail to glance at the causes, and the methods of prevention, of those terrible calamities with which, since the appointment of this national inquest, our mining districts have been more than ordinarily afflicted. In speaking of the ventilation that will reduce temperature, the investigators ought to define and to recommend the system that will prevent explosions. The two objects, if not identical, are, at all events, very nearly allied, and, to some extent, are to be pursued by similar means.

The waste of consumption, the second point of inquiry, is in itself a wide and comprehensive subject. It is one that has been often dwelt upon in the pages of the *Builder*. Considered in its full extent, it is a matter of architecture and of social habit, rather than an incident of mining. It is a question in relation to which our friends, the political economists, are signally at fault. Neither the terror of the coal merchant's bill, nor the more constant aggravation of smoky chimneys and smoke-laden skies, has induced us, as a nation, to take any serious steps towards the economical, cleanly, and perfect combustion of fuel for domestic purposes. A few bricks interposed behind the kitchen range, as a feeble barrier against the combustive fury of the cook (that great ally of the coal dealer), and a more general flattening of the grates of our sitting-rooms, constitute the main improvements which the past half-century has witnessed in our household coal burning. And the waste in the coal districts themselves, the consumption of slack at the mouth of the pit (nearly or quite obviated as it is by the application of all forms of coal-dust to the fabrication of artificial fuel), is but trifling in comparison to the thriftless and gigantic waste of our careless open fires.

The waste in production, which must chiefly depend on the more or less thorough exhaustion of every seam, by the removal of pillars and similar measures, is a point on which we may fairly expect that the report of the Commissioners will be full and conclusive. It is eminently a coal-owners' or coal-miners' question, and all concerned in the production of coal will look with interest to this portion of the evidence taken by the Commission, and probably to the expression of the opinion of the Commissioners on the subject.

The geological part of the question, or the statement of what we may call the *geological expectation* of the discovery of further supplies of coal beneath more recent strata, is understood to be that part of the subject on which the labours of the Commission are most forward. It is, indeed, almost enough that the honoured name of Sir Roderick Murchison is associated with this part of the investigation, to insure that this should be the case. The result of this part of the inquiry is, we are told, most encouraging. No doubt very much and very valuable information will be here forthcoming. Not so much that we can expect anything absolutely new, at all events to the geologist, as that we may expect to have all that is known to science, in its present phase, clearly and distinctly placed beneath the eye in a synoptic form. In this alone, even if no other result is to be anticipated, we may fully expect to find a justification for the appointment, and for the cost, of the Commission.

It is, however, evident that the practical value of this part of the labours of the Commissioners must depend, to a very considerable extent, on the results attained by the first sub-committee. Interesting as it may be to know under what surface soils, and at what estimated depths rich stores of the precious mineral may be fairly predicated to exist, the economic value of those stores will be dependent on the success of our system of deep working. Nor will the necessity, and the very serious cost, of *verifying*, by actual sinking, any prediction ventured on from merely geological premises and induction, fail to interpose a wholesome check on the activity of the imagination, or on the energy of the scientific faith, of those who seek to burrow beneath districts now innocent of coal, for the buried and long unsuspected coal measures that may, or that *ought to*, lie beneath them.

The labours of the Commission would not be complete without a glance at the poetry of the subject. For we can hardly speak of the endeavours of Mr. Robert Hunt, of the Mining Record Office, to determine the coal consumption of the future, otherwise than as an exercise of the powers of imagination, in a field which that celestial faculty has, for the moment, all to itself. All that statistics has to say on this subject can be said in a few lines. The quantity of coal which we have, or which the four sub-committees agree that we ought to have, in an economically accessible condition, will come out in an approximate statement of millions of tons. At our present rate of consumption, this will last for so many years—tens, hundreds, or thousands, as the figures may show. Thus, if we take the rate of increase of consumption (whether we go back rather more than half a century to the commencement of the era of peaceful industry that succeeded the collapse of the Gallic empire, or whether we run back to the earlier epoch, of which we now celebrate the centenary, of the binding of the genius of steam to the chariot of human civilization), we shall find a certain annual rate of increase in production and in consumption of mineral fuel to have obtained. Applying either one or the other of these two ratios of augmentation to the future, we shall again arrive at a numeric result—an Annus Domini considerably nearer to 1869 than that previously indicated. Any more elaborate attempt at prediction we think likely to be little more than waste of time. The rougher method is likely to be really the truer. As to certain branches or items of consumption, much is known, and, no doubt, by patient investigation, a pretty fair guess may be made as to the future. But other elements are altogether in embryo. New, and entirely unexpected, demands on the light-producing, heat-producing, motion-producing force of coal, are certain to spring up. On the other hand, the discovery of new sources of supply of light, heat, and motive power may be none the less confidently anticipated. Let us set the unknown against the unknown, and save the time that would be consumed to no purpose in the minute dissection of certain details of a great subject, the entire comprehension of which is far beyond our grasp.

In this, as in almost every engineering, mechanical, or chemical question, the ultimate arbiter is the ledger. People speak of discovering, or of inventing, other sources of light and heat than those of which we now familiarly make use. Mechanical men know that there is no difficulty in so doing. Electricity has been mentioned. We know something, as yet but a very little, of what we may expect from electricity. But the knot of the question lies in the pence-table. So long as, by the combustion of a pound of coal, we can produce a greater dynamic effect than by any method which does not cost more than the price of a pound of coal,—coal will be king, or, at least, coal will be employed. When, either by the increased cost of winning coal, or by the decreased cost of the application of any other source, or reservoir, of power, this pre-eminence fails to be enjoyed by the black diamond, it is to such other sources that we shall turn. Nor are we altogether without expectation that the employment of such cheaper force may diminish, or, at all events, very seriously modify the character of, the demand for the employment of coal long before we approach any indication of the proximate exhaustion of our coal fields.

Our readers will receive this remark with the more interest from the fact that an intimation which we formerly threw out as to the great source of supply of a large proportion of the mechanical power of the future, has become invested with the character of experiment in America. The papers inform us that a patent has been thus taken out for economizing the tidal force. How far this appropriation of one of the most stupendous elements of mechanical agency to the inflation of an individual purse may be possible, we cannot, of course, tell. Conveniences of detail may, of course, be protected by patent; but the idea of a tide-mill is as old as that of any form of water-mill. To propel the floats of a paddle-wheel by a rush of water, whether by a stream always gravitating in one direction, or by a reciprocating current, the inward and outward flow of which are due to the same universal force, is the same thing in principle; nor is there room for any very striking

novelty in the application of the force of a current. But there are two considerations which make the question one of unusual interest to ourselves. The first is that of the great tidal rise that occurs around the greater portion of our coasts. We may reckon this at from 15 ft. to 20 ft. on an average. In some places—as in the Yarmouth Roads—the general change in tidal level is not more than 4 ft. or 5 ft. At Chepstow, on the other hand, the extreme rise of the highest springs is stated to amount to no less than 70 ft., and on the occasion of the floating of the tube for the railway bridge it considerably exceeded 50 ft. Thus the power of elevation and depression which is exerted on our coasts, twice within twenty-four hours, and of which little or no mechanical use is at present made, is so enormous as to be practically illimitable. A mechanical equivalent far exceeding the whole effect produced by our annual consumption of coal is now entirely neglected. We cannot suppose that this will always be the case, and that the tremendous power of the tide will be allowed to expend itself for ever on the disintegration of our cliffs, or in the scouring out (or, indeed, in the silting up) of our harbours. The other consideration is, that no country in the world is so favourably situated for the economical use of the tidal power. When we compare the extent of coast-line in the United Kingdom with the acreage of the island, we must be struck with the ready accessibility of the greater part of the country. In other cases, such as in Greece, Italy, and the Archipelago, where the ratio of coast-line to area is equal, or superior, to that which obtains with ourselves, the tidal power is feeble. But in England, Scotland, and, though less remarkably, in Ireland, the broad fringe of coast, swept by a three-fathom tide, bears a very high proportion to the gross surface of the island, and is accessible in a very unusual degree. Nor must we consider that the force of current is the only mode in which the great lifting power of the tide can be exerted. Tidal basins, with influx and efflux mechanically utilised, may be constructed with signal advantage on many portions of our coast, especially in the Principality and in the western parts of the island. But the hydraulic power is limited by the area we may enclose; that is to say, by the size of the tidal basins. As to the hydrostatic power, the only limit would seem to be that of the number of machines that may be invented or constructed. The lift of the body of water that surrounds our coasts,—say to the height of six fathoms every twenty-four hours,—amounts to a mechanical force more easy to state in figures than to realise in the mind; and any application, either of the hydraulic or of the hydrostatic energy, which may be possible in the great Western hemisphere, will always, from our geographical position, be so much more available to the inhabitants of this country, that we may afford to contemplate with considerable *sang froid* the mechanical outcome of the future.

In our coal-mines, indeed, we have now learned to regard a stored-up result of the action of what we may call *celestial chemistry*. The force exerted by the heat of the sun, and utilised, and, as it were, condensed by the vegetative process, lies there ready for our use. It is but going a step further to contemplate the utilization of the forces of *celestial mechanics*. Such, in simple fact, is the tidal energy. Historically speaking, the chemical application has been first made by mankind. We burnt coal in ignorance of what combustion was. No thought of chemical science inspired the earliest experimenter, who, applying light to the black substance on which he stumbled, said,—"Aha, I am warm; I have seen the fire." The economic value of heat is a matter at the knowledge of which we have arrived empirically. If we had never needed to cook, or to warm ourselves, we should never have invented the steam-engine. But, having gone thus far on a path which we took in entire ignorance of whither it would lead us, we are in a position to look round at the wide and noble prospect that opens before us. And, regarding the question analytically, it is evident that it is simpler to produce a mechanical result by a mechanical, than by a chemical, process. Had man been obliged to "evolve" his mechanical power "from his inner consciousness," instead of having arrived at his present condition by a happy sequence of accident and of consequent experiment, he would certainly have sought the aid of the tidal flow before he had thought of burning the submerged forests of the coal measures. That which, as matter of history, is the last application of the powers of nature, would, if philosophically anticipated, have been the first. Whether, therefore, our own time may witness the economical application of the tidal process or not, we cannot doubt that, if the abode of mankind is to be prolonged on this planet to a future at all commensurate with the past, we shall draw from this inexhaustible source much of our artificial supply of heat and of motion.

GEOLOGY AND BUILDING STONES.

AMIDST the many and radical changes which all professions and trades have undergone within the last twenty years, none is so important as the necessity that now exists of acquiring the knowledge of collateral sciences, many of which ranked in former days under the head of "Ologies," to be taken up or not at the fancy of the student. They are no fancy studies now, however, but such as every man engaged in practical work must sooner or later make himself acquainted with, if he hopes to get on. Be he farmer, builder, ironmaster, brewer, or what not, there are subjects to be mastered of which his forefathers dreamt not, and of these chemistry and geology are probably the most useful: the latter, indeed, is not essential to so many trades as the former; but it is not the less useful, and especially in the provinces of architecture and building. All the same, it is a science utterly neglected by both architect and builder; and although at first it may be difficult to see the connexion between fossils and houses, there are branches of geology which are of the utmost importance to the building trade—such as lithological, which treats of the composition and character of the rocks and stones; stratigraphical, useful in all questions concerning situation, foundation, drainage, &c. And in the same way that a farmer ought to be intimately acquainted with the geologic constituents of the soil, the builder ought to have a thorough knowledge of building stones. Every builder will naturally be acquainted with the stones of his own neighbourhood or county; but taking the subject in its widest sense, there is considerable ignorance as to the geological position, durability, and capabilities of the various building stones in England, especially as difficulties are often interposed by the confusion of names, by which the same rocks are identified in different parts of the country. Even in coalfields, where one would have thought that each seam was known throughout its whole course, an interval of five or ten miles is often sufficient to give it an entirely different name, and cause the impression to the uninitiated that it is a new and different vein.

We propose to offer a few remarks from a geological point of view on some of the strata from which we draw our supplies, in the hope that they may not be uninteresting or devoid of some practical utility to the readers of the *Builder*. But, at the same time, we say the subject is of such importance that it would be worth while to appoint a commission, consisting of practical geologists, builders, and engineers, which should systematically report on the qualities of every known stone-bed in England. Take, for instance, the freestones of the oolite, and it will be allowed, that while recognising the economic value of the really good ones, an immense amount of rubbish called Bath or Portland stone, is sent out, which is quite incapable of resisting the action of the weather, and chips away at the first frost. It would be well if every gentleman who determines on building a house, or every committee which has to superintend the erection of a public monument, would, before putting themselves into the hands of the builder, go to the trouble and expense (which would be often saved over and over again) of having an analysis or report of the stone to be used. By so doing, the builder would often save his credit, and the employer his money.

There are but few districts in Great Britain in which the buildings do not attest, more or less, the geological character of the neighbourhood; and as an educated farmer ought to be able to prognosticate the formation by the adaptability to certain crops, so an architect ought to give a good guess at the same from a passing glance at the outside of a cottage, the building differences being frequently as sharply defined as those of geology.

In Gloucestershire, for instance, there is no mistaking the substantial look and the comfortable yellow glow of the farmhouses and churches on the top of the Cotswold oolite hills, and all the way thence into Oxfordshire and Wilts; but at the bottom of the same line of hills, where the lias plains of the Severn Valley appear, we find a totally different kind of country building, in which timber and plaster have played the most important parts. This shows, that the formation of lias, marls, and clays is one which is not rich in quarries; for, as a general rule, the old builders used the materials that were nearest at hand, and I have no doubt that this was partly the reason why so many of the old houses of England were built of timber and plaster. They will, in most cases, be found in districts which were well wooded, and on formations which were not prolific in building quarries, such as the lias marls of Worcester and Gloucester, or the new red sandstone marls of Cheshire and Shropshire. Carriage was an important item in those days, and country gentlemen were content to build their houses and cottages from off their own estates. They did not send fabulous distances for a particular kind of stone, like the Earl of Belmore, who built his splendid mansion near Enniskillen, of Portland stone, while he had much more beautiful, and quite as durable marble on his own grounds; or like Sir Francis Willoughby, who in 1580 built Wollaston Hall, near Nottingham, of stone from Ancaster, in Lincolnshire. He said that he got the stone cheap, because he freighted the horses back again with coal from his estate; but old Camden, who was of a disbelieving nature, declared that he did it "out of ostentation to show his riches."

Although the oolite formation is to be found running in a regular band throughout nine-tenths of the length of England, there are only a few localities in which the stone has got a world-wide celebrity, such as Portland, Bath, Cheltenham, &c. These places have become centres of production, partly on account of the superior quality, partly from their situation as regards carriage, and partly from fashion; but there can be no doubt that there are vast stores of equally good stone to be extracted at other spots.

The oolite zone, which is on an average 30 miles in breadth, extends with great regularity from Portland to Scarborough, but comprises a considerable number of divisions, in which the rocks vary extremely in their composition and value. Geologists divide the series generally into Upper, Middle, and Lower, the Upper being subdivided into Purbeck beds, Portland stone, and Kimmeridge clay; the Middle into Coral Rag and Oxford clay; the Lower into Cornbrash, forest marble, great oolite, fuller's earth, and inferior oolite. For practical purposes, these subdivisions are sufficient, although both geologists and quarrymen (but especially the former), have a fondness for minutiæ which is puzzling to beginners. The geologist subdivides according to a particular band of fossils, by which he can identify the rock and carry out his horizon into another part of the country; but the quarryman is not so scientific in his subdivisions, which are merely founded on differences which notoriously affect the character of the rock, or the manner of working. But as a general rule, although a quarryman's diagnosis as to character may be worth having, a geologist's is the only one to be depended upon as to identity of beds.

The Purbeck beds are best seen in Dorsetshire, between Weymouth and Swanage, and in the neighbourhood of Wareham, almost the only localities, indeed, where they are sufficiently developed to be worked, although they are seen in a slight degree in other counties, such as Oxfordshire and Bucks. Geologically speaking, all three divisions of the Purbeck are exceedingly interesting, because they are mostly of fresh-water origin, instead of marine. One of the beds of the middle division is known as the "Cinder Bed," and is almost wholly made up of shells of a peculiar kind of fossil oyster (*Ostrea distorta*), and near the base of the Lower Purbeck is a bed called by the quarrymen the "dirt bed," or "black dirt," which was once an old vegetable soil, and contains trunks of fossil trees.

The Upper Purbeck beds from Swanage have furnished the stone called Purbeck marble for the shafts and columns in the Temple Church, in Westminster Abbey, for the tomb of William Rufus in Winchester Cathedral, Salisbury Cathedral, and many others. It is said that the Purbeck stone used in the older churches was not of very good quality, and weathered badly. The Purbeck beds from Wareham supplied the stone for the lighthouse at Margate and the prison at Winchester. There is a marble known as Sussex marble, which is of the Wealden age—

a fresh-water formation just prior to the Purbeck beds. This is often mistaken for Purbeck stone; but the difference may be detected by the size of the fossil shells, which are larger in the Sussex stone.

TELEICONOGRAPHY.

TELEICONOGRAPHY is a long new word, which we owe to the ingenuity of our French neighbours. It means, as those of our readers who are familiar with Greek will see at a glance, the drawing of distant objects. The French have a right to coin the word, inasmuch as it indicates a new and admirable method, discovered by a French artist, by which a faithful delineation of objects so distant as to require the use of the telescope to distinguish their details, may be readily and correctly effected.

M. Revoil, an architect well known in France, from having had charge of the restoration of the Roman remains at Montpellier, Toulon, and Nimes, has recently been engaged in a special study of the early architecture of the southern provinces of the ancient kingdom. In the course of his attempts to arrive at exactitude of definition, by the aid at one time of the camera lucida, and at another of the telescope, he has been induced to make experiments as to the combination of the principles of the two instruments. The result of this effort M. Revoil has called the *Téléiconographe*.

The principle of this instrument is that of allowing the image transmitted by the object-glass of a telescope to pass through a prism connected with the eye-piece. The rays of light that would in the ordinary use of the telescope be transmitted direct to the eye, are refracted by this prism, and thrown down upon a table placed below the eye-piece. The distance between the prism and the table determines the size of the image projected on the latter, and it is easy for the observer to trace, on a paper placed on this sketching-table, the actual outlines indicated by the refracted light.

The idea once grasped, it is easy to work out the details. The telescope is fixed on a stand with screws and clamps, allowing of both horizontal and vertical motion, as it may often be necessary to give traverse to the instrument, in order to make a connected drawing of a larger area than can be included in the object-glass at one view. In fact, an entire panorama can be traced, if the relative positions of the axis of the telescope and the surface of the sketching-table are undisturbed.

We see no reason to doubt that M. Revoil's eyepiece might be adapted to the ordinary theodolite, so that any person who possesses one of these instruments may, at a small expense, obtain a good sketching apparatus.

The advantage possessed by the Teleiconograph over the camera lucida is manifest. The size of the image may be determined at will by the person who uses the former, without any diminution of accuracy. We have before us a lithograph of the summit of one of the towers of Notre Dame de Paris. The "croquis" was taken, by means of the instrument of M. Revoil, at the distance of about 300 mètres. It is 12 in. long. A sketch taken by the aid of a camera lucida is drawn alongside, and is only 1 in. in length, or one-twelfth part of the linear measure of the bold outline of the Teleiconogram (as we suppose the new likeness will be called). Two mountain peaks, in Provence, sketched by aid of the same apparatus, show how admirably it can be applied to the sketching of country. For the purposes of military surveying, its services promise to be of the utmost value.

The Teleiconograph insures certitude in drawing, but it does not draw. It is an aid to the artist, not a self-acting substitute for his eye and hand. The sharp, bold touch of a master of the art of drawing will be as distinct from the feeble peddling of an inferior workman, when the refracting prism is used, as when free-hand sketching is resorted to. The division of attention between the object and the copy, which is often so painful, will be entirely avoided by the use of this instrument. In the hands of a true artist the result will be every way admirable,—exact as a photograph, without the distortion of all those parts of the field which are distant from the centre, and at the same time marked by all the peculiarity of touch proper to the master. The camera lucida, from its greater portability, will still hold its own, but we shall hope to see M. Revoil's instrument brought into familiar use in this country, to meet circumstances for which it is peculiarly adapted.

THE EVIDENCE AS TO THE PROPOSED LAW COURTS.

AT the committee meeting on the 9th inst. Mr. Field said that Messrs. Abraham, Waterhouse, and H. A. Hunt were the witnesses on whose evidence the Commission signed the certificate that the whole scheme (including the purchase of the site) could be carried out for a million and a half. The lowest estimate for opening Turnstile was 91,000*l*. As regards light and air on the Embankment site, he had omitted to refer to the river fogs as a great and special objection to it.

Mr. Burnet, architectural clerk of the Commission, had made the map for the Incorporated Law Society. Admitted certain inaccuracies in the details of the map, which was taken from an old Parliamentary paper showing a plan of Sir Charles Barry's for a design then recommended by him in 1845. Prepared for the Commission a reduced scheme for erecting the building on the site already purchased. The bridges of connexion with the Temple over the Strand were omitted in this scheme. The plan of the Incorporated Law Society was only incorrect in details not affecting its principle. Thought Carey-street ought not to be much less than 50 ft. wide. Had shown a street 60 ft. wide at the west side of the building. Could not speak as to the probable selling value of the Carey-street site. Some of Mr. Street's criticisms on his plans were not quite accurate. The inaccuracies complained of in the Law Society's map were unduly favourable rather than otherwise to the Howard-street site, as many new offices had arisen on the north side of Carey-street, which did not appear in the map of 1845. He prepared the reduced scheme not in any way to interfere with Mr. Street, but as a suggestion to show how much of his scheme could be carried out on the land already purchased. His descriptions of the various plans were drawn up without communication with Mr. Street. The Probate offices, Royal Commission-rooms, and a few others are omitted from the reduced scheme, as also the Probate, Admiralty, and Bankruptcy Courts. The same omissions occur in the Howard-street scheme.

Mr. Street said his first great plan provided everything originally asked for by the Royal Commission, and, with the streets round it, would cover upwards of 7¼ acres. The courts were in a central block, with an internal street round it for light and air, bridges of communication around the internal street giving access to the offices beyond on the outside edge of the site. Had proposed certain additional accesses to the site from the north and west, an opening to New-square by the purchase of the houses at the north side of Carey-street; and an opening to Chancery-lane in the centre of the east front of the new building. The Commission adopted almost the whole of these suggestions, with some further additions of their own. Additional accesses to the Carey-street site appeared to him to be indispensable. At the Howard-street site he proposed to take the north as well as the south side of the street, so as to secure the erection of suitable buildings opposite the new buildings. The site gives an acreage of nearly five acres, available for building purposes. This included internal courts for light and air. Thought it an extremely good site. The accesses are good, and facilities for providing light and air, and securing quiet, are very great. Would excel the Carey-street site in those respects. The accesses to the Howard-street site are singularly good,—by the Strand, the Embankment, the railway, the river, and the bridges. The access from the north side needed most explanation. Would utilise the terrace of Somerset House as a carriage approach from Wellington-street. Had arranged with Mr. Fowler a modification of the proposed railway station. Though it was no doubt a difficulty, this would greatly reduce it, and it was no longer a serious objection to the scheme. A tunnel and arcade over it from Howard-street to the north side of the Strand could be constructed. The widening of the upper end of Essex-street would be almost necessary. The site offered great advantages in an architectural sense. A broken front would be a great advantage, and almost called for by the Embankment line being covered. A contrast with the unbroken front of Somerset House is also desirable. Could not admire the river front of Somerset House. His design projected 50 ft. beyond this front, but would hardly hide any portion of it in consequence of the considerable curve of the Embankment. There was no reason for iron rules of uniformity of frontage. Breaks were often advantageous, and good architecture always assists itself. Looking down on the building from the Strand would not be a serious objection, as many buildings looked very well under similar circumstances. The view from Waterloo Bridge would be extremely good. Anticipated no great difficulties with the foundations, which should be about 25 ft. below the level of the roadway, with a bed of concrete 25 ft. thick. The Embankment offered great advantages for building as to access of materials, &c. This advantage might be stated as an economy of 5 per cent. on the total cost of the building. The rails of the railway are to be 17 ft. below the roadway. It might possibly be necessary to go deeper than 25 ft. for foundations in some parts. Three courts and several offices are omitted in the Howard-street scheme. The general arrangement of the plan was entirely different from that proposed for Carey-street,—not quite so good in some respects, but better in others. The rough estimate of the building is 900,000*l*., inclusive of foundations. The scheme prepared for a smaller scheme on the ground already purchased in Carey-street had the same disadvantages of plan as the Howard-street plan, the shape of the land being very unfavourable and irregular on the western side. Is very inferior for light, air, and quiet. Additional accesses would also be indispensable, and very little could be saved in this respect by the reduced plan. The cost of the reduced plan in Carey-street would be about the same as in Howard-street. On the whole, he preferred the latter. Mr. Burnet, in adapting Mr. Street's plan to the reduced site, had spoilt it.

On Tuesday last, the examination of Mr. Street was continued, and various questions were put to him respecting the æsthetic disadvantages of the Howard-street site; Mr. Beresford Hope asking if St. Paul's would be improved by bringing it down from its present eminence, and placing it on low ground near the river.

Mr. H. A. Hunt was then examined. He was strongly in favour of the Embankment site, as the best for light, air, accesses, and surroundings. He considered that the further expenditure of a million of money would not make Carey-street a good site; and rather than do so, he would prefer to spend such a sum in buying the property between Howard-street and the Strand, and have it an open Court-yard in front of the new Courts, like that in front of the Charing Cross Station. This, however, was not in any way necessary, as he maintained the Government plan provided everything really requisite.

REPORT OF AMALGAMATED ENGINEERS.

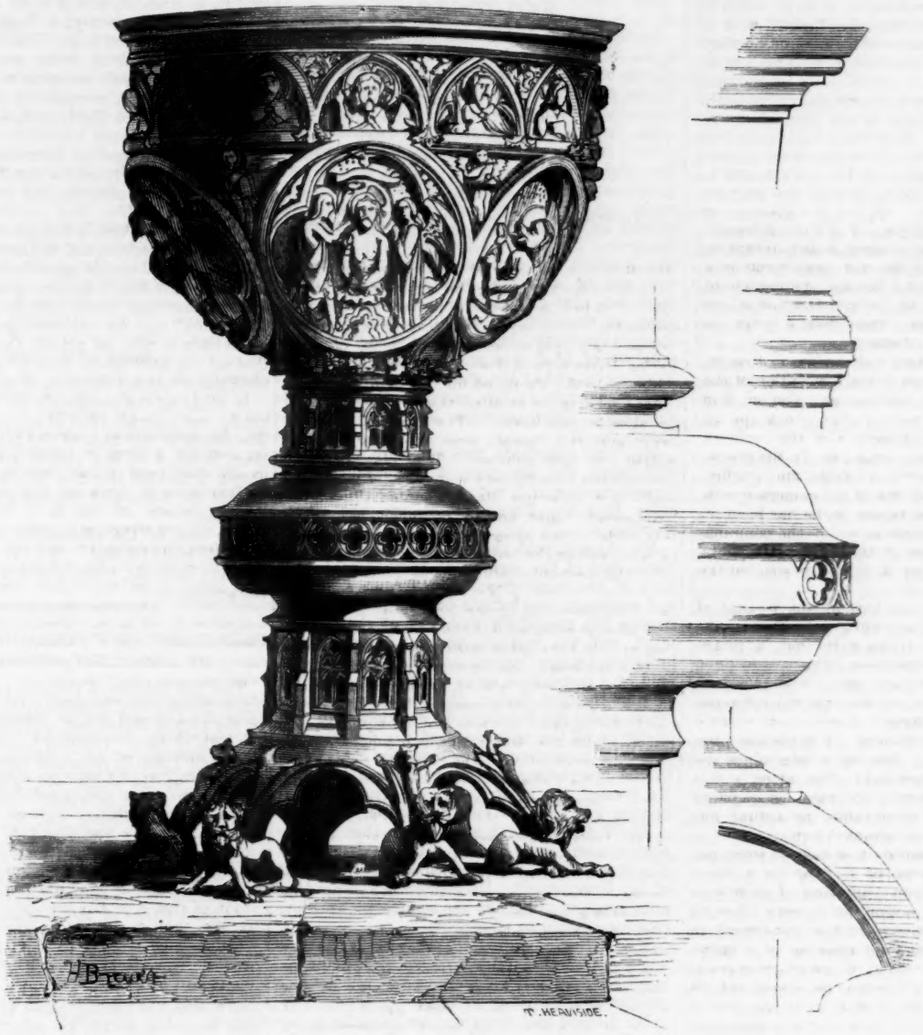
THE eighteenth annual report of the Amalgamated Society of Engineers, Machinists, &c., for last year, has been printed for circulation amongst the members. It consists, as usual, chiefly of statistical and arithmetical details relating to the numerous local branches of the association. In his few preliminary remarks, the General Secretary, Mr. Allan, says:—

"In issuing this the eighteenth annual report of our society, ending December, 1868, I deeply regret that I am not in a position to announce a more prosperous state of affairs, so far as our funds are concerned.

As in the previous year, it is my painful duty to report a large diminution in our accumulated fund, amounting to 26,564*l*. 0s. 5½d. This is attributable to a lengthened depression in trade such as we have never before experienced; and, in this respect, we have only shared the same fate as other similar societies, the depression having extended to all branches of industry, not only in the United Kingdom, but to the whole of the continent of Europe, as well as America. This state of things has, no doubt, in a great measure (if not entirely) arisen from over-speculation and ruinous competition, which for years has existed, and which still continues to exist. However, it is to be hoped that the experience gained in the past will be the means of remedying and preventing such disastrous results in the future."

This adverse state of affairs, however, is only relative; for the society has not only been able to meet all its heavy liabilities, but possesses a balance of no less than 98,699*l*., or nearly 100,000*l*. to meet future obligations. During the year, 109,809*l*. were expended. Of this sum, by far the largest amount was in donations, or for out of work benefit, namely, 64,979*l*.; the amount so expended in 1867 having been 58,243*l*. The sick-benefit expenditure was 16,992*l*.; accidents, 1,000*l*.; funerals, 5,049*l*.

Valuation of Property (Metropolis) Bill. — The House in committee on this Bill, have agreed to the clauses with some minor amendments.



FONT OF ST. MARY'S CHURCH, MÜNSTER.

FONT OF ST. MARY'S CHURCH, MÜNSTER.

THE font of which we give an illustration is a fine specimen of Mediæval church furniture. The material of which it is composed is bronze. Immediately below the rim are representations of our Lord and the Apostles (eleven only). Lower down are five great circles, which cover the bowl of the font, and these contain the Evangelistic symbols, and the baptism of our Lord by St. John. At the foot are six lions, and standing on their backs are six bats. The workmanship of the whole is very sharp. It appears to have been first cast, and then cleaned up with some sharp tool. The probable date is about 1350.

The following are the dimensions:—height, 3 ft. 10 in.; height of bowl, 1 ft. 6 in.; width of bowl, 2 ft. 4 in.; width of knob, 1 ft. 5 in.

DESIGNS FOR THE CORN EXCHANGE, ROCHESTER.

THE corporation of the city of Rochester having decided that the erection of a New Corn Exchange would be desirable, and, judging by the appearance of the very small and dingy apartment which now bears that name, not before it was necessary, requested several architects to furnish designs, and six have responded to the invitation.

The site for the proposed Exchange is very confined, being surrounded by existing buildings except on the eastern side, where it abuts on a narrow street known as Pump-lane; the southern side is bounded by the present Corn Exchange and other buildings, nearly excluding any chance of light from thence; and on the north and west the light would be partially built out, so that top lights, or very elevated windows, only could be of service.

The corporation in their list of requirements, which are very multifarious, desire,—"A large room to be used as a corn exchange, assembly-room, or concert-room, as occasions may require; the room is to be so arranged as that the present Corn Exchange may be used at the same time if necessary." The lower portion of the building is also required to contain a kitchen for the purposes of corporation dinners, a library, &c., and an entrance is to be provided from Pump-lane, as well as through the present Corn Exchange. The cost of the whole is not to exceed 5,000*l*.

The drawings have been exhibited in the present Corn Exchange, and were very well hung.

"Che sarà sarà" explains his design by six drawings to scale, a showy perspective view of a room full of elegantly dressed ladies and gentlemen, amid a tremendous array of columns, and a descriptive specification, which, if it lacks grammar, is certainly not wanting in confidence. The plan of the hall is a rectangle, 47 ft. by 85 ft. in the clear, covering nearly the whole area at command. The longer sides are divided into bays by coupled Corinthian columns, detached from the wall, standing on rather lofty pedestals, and carrying an entablature breaking forwards over each group of pillars. The whole design is very elaborate and very flashy. The ceiling is formed of two coves, one above the other, the lower groined for lunettes, and the centre is covered by three flattish glazed domes, which would appear to be very bad acoustically; although the specification informs us that the ceiling is curved to "an acoustic cove," and all deep coffers and skylights are avoided. How the specification and drawings are to be reconciled to one another it is hard to say.

A vast amount of space is lost by the columns, which project 4 ft. into the room, and evidently to no purpose structurally, for, on referring to the plan of the ground-floor, it will be found that the wall below the level of the hall is only about 2 ft. thick, and the columns stand forward above, with nothing to carry them. They are intended to be of "Marezzo marble, with plaster caps and bases gilt." So much for genuine materials and true principles. There is no accommodation for an orchestra, or separate staircase for performers. For dining purposes, arrangements are made for a lift and serving-room, and a little cranny is shown behind the marble columns for a refreshment-bar; but there are no apparent means of supplying it, except through the hall itself.

The principal approach through the present Exchange is pretty good. The stairs from Pump-lane are scarcely 3 ft. wide, rendering it out of the question to use this approach to the hall alone. On the ground-floor a considerable space is reserved in all the plans at the western end of the site for the yard of a public-house, over which the hall is carried in various ways in the different designs, some of which do not seem very secure. The library is badly lighted from the north; the kitchen is absurdly small, and not well supplied with larders or other appliances.

"Perseveranda" exhibits four sheets of drawings, and a perspective of a less pretentious

nature than the first we have noticed. In this case the hall is a rectangle, 42 ft. in width by 92 ft. in length, the sides being divided into six bays, as is the case in most of the designs, by single engaged Corinthian columns, projecting into the hall about 2 ft., and standing on plain block pedestals, but with very little support from below. The entablature, which is cut through by the windows, carries a deep cove, into which the semicircular heads of the windows are groined. The ceiling is commonplace, but the effect of the lighting from windows very high up would be decidedly agreeable. The hall occupies the whole area at disposal more completely than is the case with any other of the designs, but the necessary accommodation for concerts or public dinners, in fact for any purpose other than that of a mere corn exchange, is entirely ignored; and on the lower floor the kitchen is without scullery or larder, and the library, which is well lighted from Pump-lane, has no accommodation for a librarian. The approaches are very good, and two separate doors are obtained from the present Exchange, besides a good passage and staircase from Pump-lane.

There are two competitors who exhibit under the motto of "Ceres," the one showing a Gothic and the other a florid Renaissance design. The Gothic design is explained by eight sheets of general drawings and two perspectives, and shows the various requirements of the corporation more completely considered than is the case with other of the competitors, there being three plans of the great hall, showing its adaptability to the purposes of a corn exchange, a concert-room, or a dining-hall. The hall is a rectangle, 73 ft. by 45 ft., free from any sham columns or other projections. The general effect much resembles one of the large dining-halls at the universities.

The hall is divided into six bays, the lower portion of the walls lined with woodwork, and the upper part to a height of about 16 ft. from the floor divided into panels, one to each bay; and shown in the perspective as painted with subjects, intended, no doubt, to illustrate local events. Above these are lofty pointed windows groining into the lower portion of the roof, which is of a flattish hammer-beam construction, boarded on the under side of the ribs, and with square skylights along the ridge, which have not a good effect, and the perspective is so darkly coloured that the upper portion of the roof appears to be in a fog, and the whole effect is much more sombre than might be the case. The Pump-lane approach is good, and has convenient rooms beside it. The orchestra is of a rather unpleasant form, but has a separate staircase and retiring-room for performers close at hand. The principal staircase is so ingenious in plan that it is not easily comprehensible; some portions seem to suggest mounting four or five steps merely to come down again.

"Ceres, No. 2" displays four sheets of neatly-drawn plans and elevations, and seems, with the exception of his namesake, to have entered more fully into the necessities of the case than any other of the competitors. The hall, which is shown in a very attractive perspective, is different in plan from any of the others. It may best be described as a rectangle, 50 ft. by 76 ft., with the corners rounded off, and deep recesses at the ends, containing respectively the orchestra and a very theatrical-looking gallery. The total length of the hall is 94 ft. The walls are decorated with Corinthian pilasters, with round-headed windows between, and the curved corners are formed by similar windows, which have a painful effect. Above is a deep cove, glazed, and a richly ornamented flat ceiling.

The general form of the room would be probably good for musical purposes, but the glazed cove is a dangerous experiment. There are two staircases, and a capital entrance from Pump-lane, and the principal staircase is pretty, designed in a square hall domed. The library is badly lighted, and kitchen dark. Taking the designs as a whole, they are nearly all of a most commonplace character, and the stipulated 5,000*l.* will apparently be exceeded by most of the competitors.

The National Portrait Gallery has become so large that it is necessary to find a new habitation for it until the National Gallery has been made big enough to receive it. In the meantime it is intended to transfer it to the gallery at Kensington, where the Portrait Exhibitions of the last three years were held. The transfer will be completed by the end of the year.

ARCHITECTS IN GOVERNMENT EMPLOYMENT.

ON the vote of 18,222*l.*, to complete the sum of 34,222*l.* for the salaries and expenses of the officers of the Commissioners of her Majesty's Works and Public Buildings being moved in Committee of Supply,—

Mr. Layard (in answer to Mr. S. Booth) explained that certain changes had taken place in the officials of the office, resulting in the appointment of Mr. Fergusson as secretary of works and buildings, the gross amount of salaries to be paid by the department to remain the same. It was found impossible to retain in that position the services of another gentleman who was an architect, who admitted that he could not give an opinion upon the estimates, plans, or elevations of another architect. He thought the committee would be of opinion that a salary of 750*l.* was not too much for such a functionary, and at the same time a reduction of 200*l.* was made in the salary of the assistant secretary. Other salaries had also been reduced.

Mr. Hunt suggested that the vote should be withdrawn for the present, and hoped the Government would not decline to do so, in order that the House might see the correspondence.

Mr. Ayrton said that there were two questions, that of the permanent arrangement, and that of the temporary. The former architect and surveyor was in this delicate position, that he was the consulting architect of the department, and yet had the power of undertaking buildings for the Government, on which he was paid by a percentage, as in his private practice. It was thought better, therefore, to have an officer under the title already mentioned, to give advice on all the operations of the department. A special arrangement was made for Mr. Pennethorne completing the works he had in hand. He trusted the committee would not think it necessary to have the vote postponed.

Sir W. Gallwey did not believe that a more able or more disinterested person existed than Mr. Pennethorne, who was also an old servant of the Government. He wished to know if that gentleman was to leave the service without any retiring pension or allowance.

Mr. M'Laren wished to ask whether it was not the fact that all estimates and plans for buildings in Scotland were made out by one gentleman, at a salary of 925*l.*

Mr. Layard said there was no intention to lay the slightest blame on Mr. Pennethorne, and the only object had been to release him from a disagreeable position. Mr. Fergusson was not a practical architect, and could give an independent opinion on all matters connected with architecture. He could state that during the three or four months Mr. Fergusson had been in office his services had saved many thousands of pounds to the public. With regard to the Scottish business, the salary of 925*l.* did not include travelling expenses. As soon as Mr. Pennethorne had finished the works in hand he would receive his pension, and he was perfectly satisfied with the arrangements made.

The vote as originally prepared was agreed to.

THE REBUILDING OF CARLISLE GAOL.

THE alteration of the county gaol at Carlisle, to meet the requirements of the Prisons Act, is now rapidly approaching completion. The alterations have rendered necessary the entire remodelling of the interior of the gaol. With the exception of two wards which have been converted into bath-houses; of the governor's old house, which has been used for warders' rooms, offices, and chapel; and of the store-rooms, cells, and kitchen on each side of the entrance-gate, the whole of the old buildings, according to our authority, the local journal, have been pulled down, and the materials of which they were composed have been made use of in building the new prison. The male and female wards are now in one large block four stories high, with the governor's old house contiguous to the division wall between the two, so that communication may be had from it to both wards. There are 112 cells for male prisoners, and 56 for females. The total average number of prisoners is about 100. The alterations have been rendered necessary by the determination of Parliament to adopt the separate system, so that the casual criminal may not become contaminated by communication with habitual thieves. Every prisoner has a separate cell allotted to him; each cell being 13 ft. in length by 7 ft. in breadth, and 9 ft. in height, with an arched roof of masonry, a flagged floor, and a strong wrought-iron door. The furniture is very simple, but one thing seems exceedingly objectionable. Each cell contains what is called a *multum in parvo*, comprising an earth-closet, convertible into a food-table, as well as cupboard and washstand.

An old building has been converted into a convenient laundry, where the female prisoners wash the prison clothes, and mangle and iron them.

A new tread-wheel is being erected by Messrs. Blaylock & Pratchitt, and by its machinery water will be supplied to the gaol from a well which has been sunk 280 ft. for that purpose, the solid rock having been bored 256 ft. of that depth. The "mill" will be enclosed in a glazed shed, and within it will be placed the mat-looms, so that all the hard labour may be going on at one time under the surveillance of the same officers.

In utilizing the governor's old house an opportunity has been afforded of enlarging the chapel. The whole of one floor of the old house has now been devoted to the chapel and vestry. The chapel is divided into two by a wooden partition, so that the males and females may be completely separated.

The cost of the alterations will be between 15,000*l.* and 16,000*l.* Mr. T. Milburn is the builder; and Mr. Cory, the county surveyor, is the architect.

PIER, HARBOUR WORKS, AND NEW HOUSE OF ASSEMBLY, ISLE OF MAN.

THE first column of the new iron pier running out from the foot of Broadway, Douglas, was driven on the 17th of March last, and the last column on the 29th of June. The pier has now been carried out about 1,000 ft. from the shore, including the platform at the outer end, which is 90 ft. in length and 40 ft. in width. The railings alongside the pier are being put up, and the houses are in course of construction. It is expected that the pier, which will add to the attractiveness of Douglas as a watering-place, will be ready for opening by the end of the present month.

At the sittings of the Legislature of the Isle the plans for the extensive harbour works at Douglas have been brought under consideration. It was resolved that a sum of 10,000*l.* should be granted for a further extension of the new low-water landing-place there. The members then proceeded to consider the general question of harbour works, and, after a long debate, a resolution was arrived at rescinding a former resolution of the Legislature by which it had been decided that the sum of 122,000*l.* should be expended upon a large work of concrete extending straight across the bay, and in its stead it was resolved that a built work running out in a north-easterly direction from Douglas Head should be substituted. The last work is estimated to cost 52,000*l.* for the first 550 ft., and when it is extended to that distance, the members will be asked to decide how much further and in what direction the work is to be extended, and what the cost is to be. The governor, in answer to inquiry, said that the engineer-in-chief, Mr. Coode, would receive 600*l.* a year during the construction of the work for his services, and for the use of his London office. Mr. Powell, who would be in immediate charge of the Douglas works, as well as the works at Ramsey and Peel, would receive 1,000*l.* a year salary, and 200*l.* a year travelling expenses.

Extensive plans of harbour works at Ramsey were then brought under the consideration of the court. There are two plans of harbour works proposed for Ramsey; a built work by Mr. Coode, estimated to cost 50,000*l.*; and an iron work by Mr. Dixon, the contractor for the new pier at Douglas, to cost 35,000*l.* A committee of the court was appointed to inquire into a report on the merits of the two plans.

The plans for the new House of Assembly at Douglas were then taken into consideration. Eight architects had been invited to send in plans and estimates of this building, which is to include law courts and public offices; but only five responded to the invitation. A prize of 150*l.* was offered for the best plan, and 75*l.* for the second best. There were only four plans sent in, two of the architects, Mr. Henry Christian and Mr. Frederick Fothergill, of London, having combined. Their design was for an ornamental building in the style of the thirteenth century, and was estimated to cost 13,000*l.* Mr. G. W. Hamilton, of Liverpool,

whose design was awarded the second prize, estimated the building planned by him to cost 14,000*l*. The architect in his report, said that "he had endeavoured in the design to produce a building characteristic of its intended purpose, and had avoided costly arched openings and ornamentation." The first prize was awarded to the design sent in by Mr. Burnett, of Glasgow, which was in the Tudor style, and was estimated to cost 17,000*l*. Mr. P. Ellison, of Liverpool, proposed two plans, one in the English castellated or baronial style, to cost 13,663*l*., and the other an adaptation of the Continental Gothic, and estimated to cost 16,100*l*. The members of the court adopted the recommendation of the committee, and agreed to purchase a site for the building in an advantageous position, at a cost of 2,000*l*., and after several hours' debate, adjourned the final consideration of the plans.

NEW MODE OF LAYING AND JOINTING PIPES.

A PATENT joint has been invented by Mr. William Williams, an active member of the Water Committee of the Town Council of Liverpool. It consists simply in the direct contact or union of a cylindrical socketed with a spherical butt-ended pipe, without the intervention or use of lead or packing of any kind. The socket end of each cast-iron pipe is made of thickness uniform with the pipe itself, and strengthened by an external hoop of wrought iron. It is then correctly bored so as to form a true section of a cylinder. Upon the butt-end of the pipe is cast a projecting boss or ring, the surface of which is turned truly so as to form the zone of a sphere, of external diameter equal and duly proportioned to the internal diameter of the cylinder. The union of the two metal surfaces is thus designed to be perfectly maintained throughout a circular ring or line of contact which within the cylinder is fixed, but varies on the spherical zone according to the angle of direction at which the pipes are united, while the tightness of the joint is unimpaired by change of position. It is therefore a moveable joint, so that, within certain limits, the line of direction of the pipes may be changed, and in case of disturbance or subsidence of the ground in which they are laid, the line of pipes is self-adjusting, and the distortion is unaccompanied by fracture or leakage. It is proposed to use these pipes within the Hilton House Tunnel of the Rivington Pipe Line, where settlement is apprehended from the working of the seams of coal beneath, and a saving of 30,000*l*. is expected to result. The invention has been tested in presence of the mayor and corporation, and various architects, engineers, and others interested.

THE EXTENSION OF WORCESTER PRISON.

THE amalgamation of the city and county prisons rendered necessary an extension of the accommodation previously furnished by the county gaol. For the purposes of this extension it was decided to purchase certain property upon the west side of the old prison, and to erect on the site thus obtained an additional wing, at the cost of the city, sufficient to meet all requirements. Plans were accordingly prepared by Mr. H. Rowe, the city architect, and tenders advertised for, the one sent in by Messrs. Wood & Son, of this city, being ultimately accepted. The work was begun in September last.

The new wing is just ready for the roof. It comprises, upon the basement, capacious stores for the goods manufactured in the prison, with every facility for loading the same. There are also baths and washing-places, where the prisoners on their arrival after receiving sentence, are required to perform the most thorough ablutions before taking up their residence in the scrupulously clean and healthful apartments assigned to them. Here, too, is the apparatus for the heating and ventilation of the prison, which is upon Haden's principle. The whole is arched over with brickwork, and above, in two stories or tiers, are the cells of the prisoners, forty-eight in number. They will be well lighted, warmed, and ventilated, each cell having a separate flue communicating with the central ventilating shaft. The pure air is admitted at the top of the cell, and the impure forced through an outlet in the lower part of the cell wall. This, says our authority, the local *Herald*, is found in practice to work much better than the reverse principle commonly adopted, as the dust from the prisoners' work is thus carried downwards, and prevented mingling with the air which he is compelled to breathe. The entire atmosphere of the cell is changed once in every seven minutes. Very few rooms of private houses, says the *Herald*, would bear comparison with these cells in the matter of pure atmosphere. Each cell, moreover, has its separate and ample water supply.

The new block or wing of the prison measures about 70 ft. by 44 ft., the external walls of which are of great thickness and very strongly built, whilst along every other course of bricks are two rows of strong iron bonding, which will prove particularly troublesome to any adventurous captive who may endeavour to pick his way through the walls. Surrounding this new wing is a spacious exercise-yard for the prisoners, enclosed by a lofty boundary wall 21 ft. high. This wall on the inner side is perfectly perpendicular, without buttresses or breaks of any kind. The heavy coping-stones have been placed upon two courses of loose bricks, and though regarded as being safe and firm enough if undisturbed, will immediately yield to the force of a man's weight, as every prisoner will doubtless be duly informed. On the outside the wall is built in steps, being thickest at the base, which, however, does not seem to manifest the same sort of consideration for confederates which the perpendicular interior and the coping-stones show for prisoners.

The new gateway has been constructed in this portion of the prison. It is a double one, so that after the ponderous outer doors have been passed by the prison-van there are still massive iron gates which bar further progress. The van will thus pass into the intervening space, and the doors on the one side will be securely closed before the gates on the opposite side are opened.

BUILDING AT THE CAMP.

A VERY rapid piece of building was done at the Wimbledon Camp for Messrs. Spiers & Pond, in the shape of a *Restaurant*, which covers an acre and a quarter of ground, and contains some 9,000 superficial feet of framed and glazed work in the façade, 400 squares of flooring, besides roofing, and all the internal fittings; a bar 200 ft. long, offices, stores, cellars, kitchen, cooking-apparatus, and all internal fittings. The building, which was designed by Mr. Penrice, is put together in lengths of 5 ft., fastened with bolts and nuts, making the whole portable, and variable as to size. This building, together with the temporary erections in troop-stables, forage and commissariat stores, entrance buildings, post and police offices, canteens, and about four miles of fencing, was put up in three weeks and two days by Messrs. W. Bracher & Sons.

The trussed gutters are a little too slight, and should be strengthened next time. The supporting posts are made hollow, and serve as down-pipes in connexion with an elaborate system of drain-pipes. The kitchen was fitted up by Mr. Dray, and all the bread used was baked in three ovens put up by Mr. Batley, of Bermondsey, at the small total cost of 75*l*. The cost of the building, without the fittings, was something over 2,500*l*. The necessity for complete arrangements is shown by the fact, that more than once from 25,000 to 30,000 persons were served in a day.

THE NEW PUBLIC OFFICES.

ON the motion for going into Committee of Supply, Mr. Goldney called attention to the sum granted for the purchase of the site for the new Public Offices, and to the proposed expenditure for the new Home and Colonial Offices, and asked the First Commissioner of Works if he had any objection to lay on the table of the House a plan of the land already purchased, and of the land intended to be acquired, with an explanatory statement, showing what portion of the land was intended to be built upon, the amount of money already laid out, and when and for what purpose it was expended. He also desired to know if a plan and estimate for the new Home Office had been prepared; and if so, the amount of the estimate, and where plans could be seen.

Mr. Layard replied that the only objection was that the information had been already laid before the House. One portion of the plan had already received the assent of the House, and had to a great extent been proceeded with, and a Bill was before one of the Committees upstairs relating to the acquisition of additional land, and the completion of the remainder of the buildings. As soon as that Bill was considered by the Committee, and decided upon, full opportunity would be given to the House to discuss its details. The cause of the delay in the carrying out of the scheme of buildings was, that when he came into office he found it advisable to have Mr. Scott's plans reconsidered. That had since been done, and the result had been some additional buildings, which he believed would be found of much use.

In reply to Mr. Kinnaird and Mr. Candlish, Mr. Ayrton stated that the sum expended up to the present time was 706,223*l*., and that the total estimated cost was 1,181,000*l*. Of this sum the India Office would refund 87,000*l*., so that the actual expenditure would be 1,094,000*l*. This latter sum, however, was subject to a further reduction of 50,000*l*. on account of exchange of property, but that was a matter still under consideration.

BRADFORD MARKETS COMPETITION.

SIR,—Amongst the numerous improvements now being effected, or proposed to be effected, in the Borough of Bradford, perhaps none is so desirable, none so urgently required, as a covered market. The indescribable place at present used for market purposes is situated near the Manor Hall, and has until within a few years been the property of the ladies of the manor. By a recent Act of Parliament, however, the Corporation have obtained possession of the property as lessees for 999 years. Since the passing of this Act, various propositions have been made with a view to the improvement of the markets accommodation of the town, but without any practical result at present.

In March last, advertisements were issued inviting the architects of Bradford to furnish designs in competition for a new covered market to be erected on the present site. The immediate object of the restriction (which, however, it is rumoured, has been violated) is not easy to perceive; but probably the committee felt that the peculiar circumstances of the site rendered necessary something more than an ordinary survey; but, if this did not constitute the motive, probably it was the *amour propre* of the townsmen, and a prophetic pity for strangers who might possibly be induced to enter the lists, that prompted them. The instructions issued to competitors contained the usual conditions, and appended thereto were three plans showing certain lines "determined upon by the council." In addition to the market itself, the competition was to include designs for exterior buildings, as shops, &c., with which it was proposed to surround *three* sides of the site.

The drawings were delivered on Thursday, the 1st July inst., and on Friday, the 9th, eight days afterwards, the Markets Committee met, and in two brief hours made their choice.

The amount proposed to be expended on the market alone is 20,000*l*.; the surrounding buildings are estimated by one of the competitors to cost 12,000*l*. The "job," therefore, is an important one, and eleven competitors have expended their time in endeavouring to meet the views of the committee. Twelve sets of drawings have been sent in, varying in number from four to thirteen; it may, therefore, safely be presumed that the committee had really an arduous task to perform in the time which they devoted to it, especially as each competitor furnishes a report with his drawings. Reading the reports alone would probably consume the whole of that time, leaving the members no opportunity to compare the merits of the various plans, or to decide upon the correctness of the descriptions given by their authors, or to ascertain whether they had conformed to the instructions or wisely altered them; or, indeed, to investigate any of the numerous questions of utility and appearance which a conscientious consideration of the subject demanded.

As Bradford offers to architects another opportunity of competing for her public buildings, it is desirable that architects should be informed how "they manage these things in Bradford;" and if those to whom the interests and welfare of the town are committed are bent upon sacrificing their public duties to their private proclivities, it will be well for architects to know how to avoid any attempt to confer the benefits of their art and learning upon them.

It will be easy to surmise what kind of decision this is which has been arrived at. Caught by the usual attractions of gorgeous, but not over-strict perspective, and high colour, both the conditions of the competition and the requirements of the public, in some cases, have been overlooked. The first selected design, *Experientia docet*, said to be by Messrs. Lockwood & Mawson, is shown in a beautifully-executed set of drawings. The perspectives, which are highly coloured, are brilliant in effect, and really beautiful as works of art. In considering the plan, however, there seems to be some loss of space in the otherwise picturesque octagonal pavilions which are placed near the two principal entrances. Some of the competitors have, we think wisely, for economical reasons, adopted galleries; these are not shown in the drawings under notice, but it is stated that they might be added; whence an effect is obtained which could not be realised consistently with an advantageous investment of the public money. The character of the interior is not in the least degree that of a market, but partakes rather of the nature of an arcade for fashionable shops; a lounge for dandies, rather than the market-place of a working man. The interior, apart from this paltry consideration of utility, is very pleasing; the enclosing walls being admirably arranged, and the light obtained from the north. The limitation of price, however, has not restrained the designer.

The design placed second in order of merit, "Northern Light" (imputed to Messrs. Andrews, Son, & Pepper), is less ingenious in plan, and relies on the arrangement of the light for its intrinsic merits. The roofs seem admirably designed for the retention of snow; and it is questionable whether the arrangements proposed, which give a glazed surface towards the north, and open luffers towards the south, would be at all effective in excluding heat. The preceding competitor is at least more successful in his arrangements in this respect. The entrances are bold, pretentious, sensational; but the remaining portions of the design are effective and well-proportioned.

The third premium is awarded to a set of drawings signed "Municipal," reported to be the work of Mr. Hargreaves. The plan is highly elaborate, the classification of the trades having been worked out. Objection might be taken to many of these arrangements; but it seems to me that all fish should be excluded from a general market; and the position of the conveniences is most deplorable. The roof is complicated and expensive, without attaining much effect. The style of the exterior buildings shows some ability; but the author loses good proportions whilst seeking after novelty of form.

The whole exhibition forms an interesting collection of drawings; but some of the competitors will feel that they have placed themselves in the position of a captive slave in the triumphal procession of a Roman general, devoting themselves to the public amusement without prospect of adequate rewards. But since the decision above alluded to is merely the recommendation of a committee to the town council, and will not take effect until ratified by the latter, there is yet time to hope that other means may be adopted to arrive at a right decision on merits whereof drawing is not the greatest. Some of the other competitors seem to have carefully restrained their architectural fancies within the limits of the purse committed to them; and it seems unjust both to the ratepayers of the borough and to the twelve firms who compete, that the decision should be left to a body of a dozen gentlemen, with no special qualifications for the undertaking. Had these been a dozen architects, they would have known more than would have allowed them to decide in so short a time; and it is not reasonable to expect that, being what they are (doubtless highly respectable and worthy) tradesmen, namely, they could perform such an astounding feat as to fully apprehend and pronounce justifiable judgment on so many drawings with such despatch. It is highly desirable, in order that the best man may be placed first, that professional advice should be called in.

INTEGER.

From Ireland.—The Roman Catholic Church of Ballybohill, county Dublin, has been recently altered and remodelled internally, and a new tower, with belfry and spire surmounting the same, added at south-east angle. Mr. J. J. Lyons is the architect; Mr. Wm. Conolly, the builder.

INAUGURATION OF KING'S LYNN DOCK.

WE have mentioned that the new dock at Lynn was inaugurated by the Prince and Princess of Wales. The water area of the dock basin is 6¼ acres. The form is that of an irregular quadrangle, the southern side being 780 ft. in length, and the northern side 590 ft. The width from north to south between the edges of the quays is about 440 ft. At the water surface the width is 420 ft., and the average depth of the dock is 31 ft. The dock is not surrounded with perpendicular quay walls, but has banks with an inclination of 1¼ horizontal to 1 perpendicular, the slopes being faced or paved with solid blocks of concrete. Small craft can get up pretty close to the quays, and to accommodate vessels of considerable draught seven timber jetties have been constructed—four on the south side and three on the north side. Each jetty is 16 ft. wide and 32 ft. long, and the floors are furnished with rails leading to the lines round the dock, which are to be brought into easy communication with the Great Eastern system. The concrete blocks used in facing the dock basin are 4 ft. square and 15 in. thick, and they are composed of Portland cement, sand, and shingle. Of these blocks 5,000 were used; they are placed on a layer of concrete and jointed with cement. The foot of the sloping wall or pavement thus formed rests on a foundation of church stone, bedded with concrete, carried down from 2 ft. to 4 ft. below the bottom of the dock. The lock-gates were put together on the spot, the ironwork being supplied by Messrs. Tod & Son, of Edinburgh. The contractor is Mr. Lawrence. The plans were prepared by Mr. Brunlees, C.E. The Dock belongs to the King's Lynn Dock Company, who were incorporated with an authorised capital of 88,000*l*.

SURVEYORSHIPS.

SIR,—You would confer a very great favour upon many of your subscribers by giving the results of elections for surveyorships, with the name of the successful candidate; as in too many cases the election is only a farce, candidates being selected and requested to attend (at great expense) from long distances, while all the time some favoured individual is picked out for election.

J. B.

*** We do so on all occasions when the names reach us.

SUBTERRANEAN ROME.*

ALTHOUGH most educated people have a tolerably well-defined impression of the nature and appearance of the subterranean primitive Christian cemeteries of Rome, there are yet many facts concerning them of which they must necessarily be in ignorance, because as time goes on fresh discoveries are made which furnish new information. Most people, for instance, will be surprised to hear that the extent of galleries now found, would, if drawn out in a straight line, stretch from the northernmost part of Italy to its southernmost shores. In many particulars, too, the newest information requires us to throw away opinions that were supposed to be founded on facts. Thus it is now ascertained, and demonstrated too, that the subterranean galleries and chambers are not adaptations of old sandpits or *arenariæ*, but were originally made by the early Christians for the purpose to which they put them. It used to be looked upon as certain that the pozzolana so largely used in building operations in Rome was found here, and that the workings, when abandoned because exhausted, were thus utilised. Ordinary English visitors to the dim, narrow labyrinthine passages, and the crypts opening out of them, looked into their "Murray," as that publisher's handbook is familiarly called, and read, "The origin of these subterranean cemeteries was evidently for the purpose of extracting that peculiar species of volcanic ashes called pozzolana, so extensively used by the ancient and modern inhabitants in their constructions. Nearly all the catacombs can be traced to no other cause. Originally *arenariæ*, the classical designation of these sandpits, they were arranged by the primitive Christians for their new destinations of dwellings, places of worship, and retirement;" and having read, they believed. More earnest students consulted bulkier volumes, but found the same opinion expressed. Looked at from an artistical point of view, too, the paintings with which they are decorated were formerly described as poor, meagre, and feeble. To entertain these opinions to-day, however, is to have fallen out of the ranks in the grand march of progress, to be behind the time, and of the old school. Murray's chapter on the catacombs was newly written for 1868, renouncing these views, and substituting for them the newly-observed fact that the catacombs were excavated out of the *tufa granulare*, which material was useless for any other purpose, showing that it must have been selected by the early Christians as suitable for graves, and not adapted by them because it was already hollowed out ready to their hand. Again, the language of the old criticism of the worth and date of the art-work no longer applies. Specimens that were inaccessible and scarcely to be made out have in these latter days been opened out; many others have been found, and a certain degradation from simplicity and excellence to be noted in those examples that are clearly the first steps of Mediæval effort, points out that many works of much richness, freedom, and variety must be of earlier date than those of this stiff and meaner type. And when this poorer style of art is known to belong to the end of the third century, it follows that the earlier specimens must have been painted in days that were close upon those we term Apostolic.

Who is it that makes these discoveries, and comes to these conclusions? As is well known, a Commission of Sacred Archæology has been directing excavations for some years, and among the members of this Commission were the late Padre Marchi, who published an important work upon the monuments of the primitive Christians, and in other ways gave great impulse to the interest felt about them; and the Commendatore de Rossi, who has given nearly thirty years of his life to a minute examination and classification of the same relics of early Christian art. For the last few years all eyes in Rome have been directed to the appearance of a rumoured work by this last-mentioned authority, which was expected not only to recount the proceedings of the society, or the results of them, but to give to the world a narrative of surpassing interest, which his discoveries would enable him to relate. Padre Marchi's work was published in 1841. The twenty-eight years that have elapsed since that date have proved more fruitful than the two centuries that preceded it; and De Rossi's industry has been rewarded with the discovery of six or seven historical monuments of great interest, to the position of which, owing to his intimate acquaintance with all the old records, and, specially, two ancient itineraries, he was able to point beforehand with sufficient precision to lead to a successful search. The Commendatore's work, profusely illustrated, and entitled "Roma Sotterranea," has now appeared, and has been received, in Italian archæological circles, with much cordiality as well as profound respect. And now Messrs. Longmans & Co. have placed it in the power of the English reader to make himself conversant with the nature of the recent discoveries on sites so indissolubly connected with the fortunes of those who first embraced the new faith the apostles preached, by publishing an admirable condensation of it, with his consent, in the English tongue. They have committed this task of compilation to Dr. Northcote and the Rev. W. R. Brownlow, who have executed it with much fidelity, appreciation, and some, if not quite sufficient, circumspection.

To study these ancient catacombs, where not "cooked," is to take up the history of Christianity from the time and place where the New Testament breaks off the wondrous thread. Immediately we approach them we are transported back to those old times when the bodies of St. Peter and St. Paul were but newly buried; and when many who had listened to their stirring words entranced, were still living. De Rossi speaks positively on this head:—"Precisely in those cemeteries to which history or tradition assigns apostolic origin, I see, in the light of the most searching archæological criticism, the cradle of Christian art and Christian inscriptions; there I find memorials of persons who appear to belong to the times of the Flavii and of Trajan; and finally, I discover precise dates of those times." There is one inscription known bearing date the third year of Vespasian,

* Roma Sotterranea; or, Some Account of the Roman Catacombs, especially of the Cemetery of San Callisto. Compiled from the Works of Commendatore de Rossi, with the consent of the Author, by Rev. J. Spencer Northcote, D.D., President of St. Mary's College, Oscott; and Rev. W. R. Brownlow, M.A., Trinity College, Cambridge. London: Longmans, Green, Reader, & Dyer. 1869.

i.e. A.D. 72, but no record has been kept of the site on which it was found. In the catacomb of St. Lucina, however, scratched on the mortar of one of the *loculi*, was found by Boldetti a record of the time of the Consulate of *Sura et Senecio*, which marks the year A.D. 107; and another on marble in the same place recording *Piso et Bolano*, Consuls, A.D. 110; as well as a third inscription which De Rossi considers marks the burial of a Christian within forty years of the time that the body of St. Paul was deposited in the same place. This interesting record runs thus:—

"DORMITIONI
T . FLA . EVTY
CHIO . QVI . VI
XIT . ANN . XVIIII
MES . XI . D . III
HVNC . LOCVM
DONABIT . M
ORBIVS HELI
VS . AMICVS
KARISSIMVS
KARE BALE"

"As a resting-place for Titus Flavius Eutychius, who lived nineteen years, eleven months, three days, his dearest friend, Marcus Orbius, gave this spot. Farewell, beloved."

The cemetery of Saint Priscilla, on the Via Salaria Nova, always said to have been dug on the property of the family of Pudens, converted by the Apostles, also presents evidences that confirm the statement of this antiquity. The catacomb of St. Agnes is supposed to be no other than the cemetery of Ostrianus, described by Pauvinus, the Augustinian friar, as the oldest of all, "because it was in use when St. Peter preached the faith of the Romans;" and, again, the sepulchre at Tor Marancia is now identified as that cemetery which was formerly called by the name of St. Domitilla, or by that of her chamberlains, Saints Nereus and Achilles, for two inscriptions found there clearly state that the ground formerly belonged to this member of the imperial family. After glancing in succession at the principal catacombs supposed to be of apostolic antiquity, the authors of this summary of De Rossi's work, thus draw up the facts of the position:—

"The local traditions of ancient Christian Rome have come down to us, partly embodied in the acts of the martyrs; partly in the stories that were told to foreigners visiting the city in the seventh and eighth centuries, and by them committed to writing in itineraries; partly in the 'Books of Indulgences,' and in the 'Book of the Wonders of Rome,' compiled both for the use of strangers and of citizens; partly also, but more sparingly, in the scattered notices of a few Mediæval writers. From a diligent comparison of all these various authorities, it is gathered that some five or six of the subterranean cemeteries of Rome were believed to have had their origin in apostolic times; and in every one of these instances, so far as we have an opportunity of examining them, something peculiar has been either noted by our predecessors, or seen by ourselves, which gives countenance to the tradition. When these peculiarities are brought together, they are found to be in perfect harmony, not only with one another, but also with what we should have been led to expect from a careful consideration of the period to which they are supposed to belong. The peculiarities are such as these:—Paintings in the most classical style, and scarcely inferior in execution to the best specimens of contemporary Pagan art; a system of ornamentation, in fine stucco, such as has not yet been found in any Christian subterranean work later than the second century; crypts of considerable dimensions, not hewn out of the bare rock, but carefully, and even elegantly, built with pilasters and cornices of bricks or terra-cotta; no narrow galleries, with shelf-like graves thickly pierced in their walls, but spacious *ambulacra* with painted walls, and recesses provided only for the reception of sarcophagi; whole families of inscriptions, with classical names, and without any distinctly Christian forms of speech; and, lastly, actual dates of the first or second century. It is impossible that such a marvellous uniformity of phenomena, collected with most patient accuracy from different and distant cemeteries on all sides of the city, and from authors writing at so many different periods, should be the result of accident or of preconceived opinion."

Two of the itineraries mentioned as having conveyed useful information to the archæologist were discovered only about a hundred years ago in the library of Salzburg, and were therefore unknown to Bosio and other writers on the Christian remains after their discovery in A.D. 1578. One of these important guides was written between the years 625 and 638, and the other within a few years of the same date. The first starts from the centre of Rome, passing out through the Flaminian Gate, and passes to the principal roads from one to the other by by-paths, some of which can be still pointed out; the other follows a similar plan, but is second to it in interest, because the writer does not seem to have actually made the survey himself, but rather to have compressed the descriptions he gives from some larger work; but both of them are useful in containing mention of topographical details concerning the cemeteries before the great work of emptying them of their choicest contents was commenced. A third document that has been useful in pointing out the locality of particular tombs is a list of relics collected by Abbot John from the various shrines in the catacombs, in the days of St. Gregory the Great, for Theolinda, Queen of the Lombards, which list is written on papyrus, and preserved with some of the relics in the cathedral of Monza. But the chief clue to the success of De Rossi's labours was the tact which enabled him, instead of rejecting these authorities as worthless, to accept their help. He saw that where St. Damascus and other early popes had been at the trouble to build spacious staircases down to particular spots in the catacombs, would be found the tombs of martyrs that were once visited by pilgrims, for whose accommodation these means of access had been made. Whereas, Padre Marchi avoided such places as bore evidence of having been tampered with in later times, and was always on the look-out for chambers and galleries in their primitive condition as when first hewn out of the rock, De Rossi judged that where the crypts had been changed into sanctuaries, *luminaria* opened out for light and air, galleries widened, and any other structural arrangements made for the accommodation of numbers, then he stood upon a site of the utmost value. Pope Damascus, too, must not be overlooked for the large share he has borne in handing down a true history of the contents of the catacombs in his custom of renewing old inscriptions, and placing others to mark important sites. His assistance, rendered 1,500 years ago, has been invaluable. The beginning of the fifth century, when Rome was sacked by the Goths, ended the history of the catacombs as cemeteries; and for the next 400 years they were used only as shrines and places of pilgrimage, except in rare instances, when they have been chosen as places of refuge, as when Boniface I. concealed himself for a time in the cemetery of St. Felicitas. The popes during these centuries kept the tombs of the martyrs beautified and repaired, as we may see from entries in the *Liber Pontificalis*. Even after Totila had desolated Rome these were restored, and the services renewed, John III. ordering that oblations, cruets, and candles should be sent from the Lateran Palace for the ceremonies every Sunday. But after the siege by the Lombards, under Astolphus, when some of the graves were broken open and the bodies carried off, Paul I. resolved to remove "the bodies of the martyrs, and confessors, and virgins of Christ" into Rome, and place them in a church he built to receive them, dedicated to SS. Stephen and Sylvester, on the site of the house in which he was born and bred, and which he had then inherited. On this occasion more than a hundred saints were removed, and their names duly chronicled in a list still extant. The succeeding popes endeavoured, however, to rehabilitate the ancient cemeteries with their ancient glories, but without much popular support; for, in consequence of the crypts of the martyrs being destroyed and abandoned, Paschal I. translated 2,300 bodies in July, 817; and this new feature in the history of early Christian relics remained in great favour for some time, the succeeding popes not only translating more, but re-translating those already deposited in Rome. Thus rifled, ruined, and abandoned, the cemeteries that were not near monasteries were one by one forgotten. In those that were so fortunately situated lamps were kept burning as late as the eleventh and twelfth centuries. A pilgrim of the eleventh century noticed the cemetery of St. Valentine, on the Via Flaminia, and another writer mentioned it again in the twelfth century. In the fourteenth century, a statistical account of Roman churches mentions only three that were attached to cemeteries; and by the fifteenth there was only one cemetery that was left open and frequented by pilgrims, which was that beneath the Church of St. Sebastian, called in old documents, *Cœmeterium ad Catacumbas*. This title, applying only to the part of the Campagna in which the church was built, just as the circus built in the same neighbourhood by Maxentius, was called the *Circus ad Catacumbus*, has since been indiscriminately given to all subterranean cemeteries over the globe. Except as belonging to that of St. Sebastian, the term is not mentioned in old times, the names in use being *hypogæum*, *cœmeterium*, *martyrium*, or *confessio*.

A set of terms, new, yet very old, has to be mastered by those who would understand anything of these ancient burial-places. The little chambers opening out of the narrow passages are known as *cubicula*. An ordinary grave,—that is, a flat oblong compartment large enough to receive a body, hollowed in the sides of the passages, generally in tiers one above another,—is called a *locus* or *loculus*. When a grave was made large enough to contain two, three, or four persons, it was called *bisomum*, *trisomum*, or *quadrisomum*, accordingly. There are to be seen in many of the *cubicula* graves of a more ornamental type. These consist of a semicular arch recessed in the wall, below the straight base line of which is sunk the space for the body; they are called *arcosolia*, *solium* being the term in use among the pagans for their funeral urns. Sometimes the recess is found square-headed instead of semicircular: when De Rossi, for the sake of distinction, calls it *sepolcro a mensa*. Burial was called *depositio*, and those who dug the graves, *fossores*, in old writings. We quote the authors' description of the uses, beyond burial, made of the tombs in the subterranean cemeteries:—

"Those of the *arcosolia*, which were also the tombs of martyrs, were used on the anniversaries of their deaths (*natalitia*, or birthdays) as altars whereon the holy mysteries were celebrated; hence, whilst some of the *cubicula* were only family vaults, others were chapels, or places of public assembly. It is probable that the holy mysteries were celebrated also in the private vaults, on the anniversaries of the deaths of their occupants; and each one was sufficiently large in itself for use on these private occasions; but in order that as many as possible might assist at the public celebrations, two, three, or even four of the *cubicula* were often made close together, all receiving light and ventilation through one shaft or air-hole (*luminare*), pierced through the superincumbent soil up to the open air. In this way as many as a hundred persons might be collected in some parts of the catacombs to assist at the same act of public worship; whilst a still larger number might have been dispersed in the *cubicula* of neighbouring galleries, and received there the bread of life, brought to them by the assistant priests and deacons. Indications of this arrangement are not only to be found in ancient ecclesiastical writings; they may still be seen in the very walls of the catacombs themselves, episcopal chairs, chairs for the presiding deacon or deaconess, and benches for the faithful, having formed part of the original design when the chambers were hewn out of the living rock, and still remaining where they were first made."

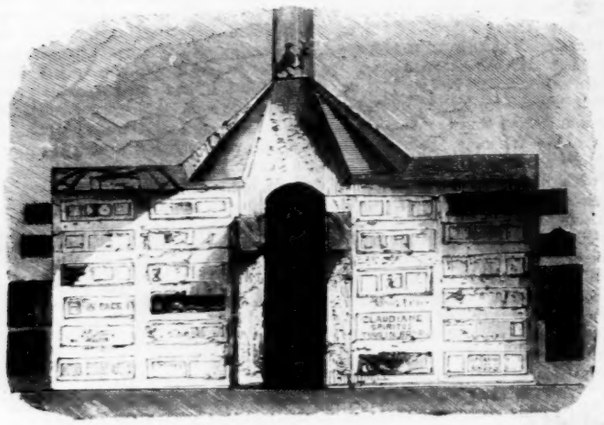
We are enabled to reproduce from the book three views in the catacombs, and the plan of a portion which serves to show the way in which the galleries ramify.

Prominence is given in the work before us to the cemetery of St. Callixtus. This, it will be remembered, is that which De Rossi discovered on the Via Appia, after having seen only a fragment of a marble slab, bearing part of the letter R and the syllables NELIUS MARTYR, in the cellar of a vineyard, in 1849. He induced Pope Pius IX. to purchase this and the adjoining vineyard, and in the course of subsequent excavations found the other portion of this slab, with the missing piece of the letter R and the letters C O upon it, which showed him that the conjecture he formed that the tomb of Cornelius, pope and martyr in the middle of the third century, was before him was correct. This tomb he knew from the old writings was close to the cemetery of St. Callixtus, in which there was a chapel more famous than most others, as the bodies of the popes in the third and fourth centuries were deposited in it, to which adjoined another chapel in which St. Cecilia was laid. The author of the earliest itinerary we have mentioned, specially mentioned this cemetery as containing "an innumerable multitude of martyrs; first, Sixtus, pope and martyr; Dionysius, pope and martyr; Julian, pope and martyr; Flavianus, martyr; St. Cecilia, virgin and martyr. Eighty martyrs rest here below." Further excavations were made, in the course of which 121 fragments of one of the Latin inscriptions Pope Damascus put up were found. When put together, and a few missing letters or syllables supplied by the context, this inscription read as follows:—

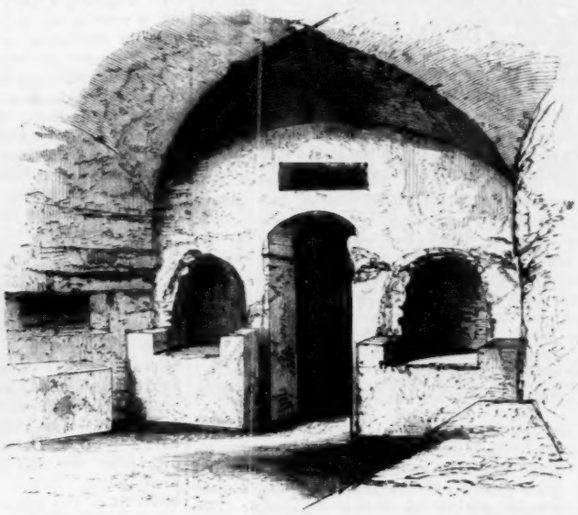
"Here, if you would know, lie heaped together a whole crowd of holy ones.
These honoured sepulchres inclose the bodies of the saints;
Their noble souls the palace of heaven has taken to itself.
Here lie the companions of Xystus, who bear away the trophies from the enemy;
Here, a number of elders, who guard the altars of Christ;
Here is buried the priest, who long lived in peace;
Here, the holy confessors whom Greece sent us;
Here lie youths and boys, old men, and their chaste offspring,
Who chose, as the better part, to keep their virgin chastity.
Here I, Damascus, confess I wished to lay my bones,
But I feared to disturb the holy ashes of the saints."

This decided De Rossi that he was in the Papal vault mentioned, ruined indeed, with its approaches blocked up, probably to preserve it from depredators, but still containing fragments among its *débris* of monuments of great interest. In one corner of this crypt, to which access was at first obtained, it appears, down the *luminare*, though one of the ancient staircases has now been restored, is a narrow doorway, cut irregularly in the rock, which opens into a large chamber about 20 ft. square, furnished with a wide *lumi-*

THE CATACOMBS, ROME.



Section of Chamber in Catacomb of St. Marcellino and St. Pietro, showing lower End of the Shaft of the Luminare, with Dove painted on it.



Interior of a Cubiculum in St. Agnes, with Chairs and Bench hewn out of the Rock.

Gallery, with Tombs.

Plan of Part of Catacomb of St. Agnes.

nare, which enables it to be well seen now. When first found it was filled with earth, which had to be removed, as in other instances, to the surface through this *luminare* or shaft from above. As this work proceeded, and the *luminare*, also full of earth, was emptied, the figure of a woman in the attitude of prayer was deciphered on the wall; below this a Latin cross between two sheep; and below this again, though still in the *luminare*, the figures of three saints. On the wall of the chamber, close to the entrance-way from the burial-place of the popes, was found a painting of a woman, "richly attired, and ornamented with bracelets and necklaces such as might be looked for in a high-born and wealthy Roman bride, and might well be intended to represent St. Cecilia." But this painting, which appeared of seventh-century date, was found to be executed on the surface of ruined mosaic-work; and a niche close by, decorated with a Byzantine head of our Lord, was also noticed to have been previously encased with marble, indicating there had been a renewal of ornamentation, marking a site of high religious interest. This fact, taken in connexion with the circumstance that close to these paintings was a recess large enough to hold a sarcophagus, and which left but an inch of rock between it and the back of a similar recess in the Papal crypt, and compared with the statements in the documents we have mentioned, led De Rossi to the conclusion that it was in this chamber that the beautiful Christian bride of the martyr Valerius was laid, after three strokes of the executioner had left her to bleed slowly to death on the pavement of her own palace. The legend is related at length in the volume before us. We must pass on to notice two new matters relating to this cemetery, or these cemeteries; for, we should explain, in this neighbourhood there were several Christian burial-places, each complete in itself, and following the outlines of the space of ground above, given for the purpose, but which in course of time have been connected with one another by long passages, so as to make one vast subterranean area. One of these points is a new method of mapping subterranean galleries, invented by Michele De Rossi, the brother of the archæologist. The writers speak of "a most ingenious instrument" he has devised, by means of which maps of Roma Sotterranea will be as complete as those of any modern city. We shall return to this volume on another occasion.

CANOPIED STATUE OF HER MAJESTY THE QUEEN, FOR BOMBAY.

OUR engraving represents a monument which has been executed in this country, and is about to be sent out to India. It is a present from the King of Baroda to the Victoria Gardens, Bombay, where it will be set up, and is the design of Mr. Noble, of Bruton-street. The figure was executed by him, and the architectural part by Mr. Earp, of the Kennington-road. The figure of the Queen is of colossal proportions, being more than 8 ft. in height, seated. Her Majesty is in her full robes of State, with the sceptre and orb—emblems of her dignity,—and is seated on her throne. The figure has a very dignified appearance. The material of which it is made is white marble. The canopy, which is 42 ft. high to the top of the finial, is of white Sicilian marble. It is of Gothic type, and well executed. The background of the interior is slightly relieved with a pale Sienna-tinted marble, enriched with a diaper incised, and an inscribed garter. The pillars on each side of the front are also of pale Sienna marble, richly chiselled. The base is composed of steps, the lowest of which is 18 ft. wide, and 22 ft. deep from front to back.

CANOPIED STATUE OF HER MAJESTY THE QUEEN: VICTORIA GARDENS, BOMBAY.
MR. NOBLE, SCULPTOR.

WELLCLOSE-SQUARE.

SIR,—The reason given by the Metropolitan Board of Works for its late decision in the matter of the proposed Wellclose-square Free Recreation Ground is so curious (if the reports which I have seen of it are accurate), as to require some notice. "The Board cannot recommend any steps to be taken in the matter, as the centre of the square has been sold for building on." This is the decision of London's only guardian of open spaces, the Metropolitan Board, respecting a suggested open space *not now built upon*, in a quarter of London where the people are so thick that if all London were as populous, the metropolis would contain 14,000,000 souls, and where the people are so poor that they cannot afford to waste the time in walking through the miserable streets to the nearest free recreation-ground, two miles off, for that walk would "cost a meal!"

The noble book of Mr. Robinson, on the "Parks, Promenades, and Gardens of Paris," to a review of which book you lately gave such worthy prominence in your ever-graceful columns, had better be burned at once by the common hangman if the reason given for this decision of the Board for the *Protection* of Open Spaces in London is sound! W.

THE ANGLO-ROMANO GAS COMPANY.

AT a meeting of the directors of this company, held in Rome at the end of last month, to elect a new *gerant* in place of the late Mr. James Shepherd, Mr. Charles Ponchain, who had been with him as engineer for several years, and was expressly pointed to by Mr. Shepherd to succeed him, was unanimously elected. The following address to Mrs. Shepherd, determined on at the same meeting, serves to show the high consideration in which the late *gerant* was held:—

"NOBILE SIGNORA,—The greatest consolation, under the loss of our dear ones, is the esteem and consideration in which they were held by all who chanced to approach them. You may, in the very heavy affliction that troubles you, comfort yourself with the thought that to very few is it given during life to attain to the admiration and esteem that our much-loved Mr. Shepherd deservedly acquired for himself in the minds of all.

Our colleagues, who assembled on the 23rd of last June to consider their loss, charged me to express the feelings of lively grief which they all most sincerely share with you.

The demonstration, therefore, of the undying esteem and regret that they so deeply feel for his beloved memory suggests the erection of a monument in the place where, through him, our business sprang up and flourished.

The fear of preventing the afflicted family from honouring its head as it thinks best, withholds the partners themselves from directing any memorial to be erected in the place where his mortal remains repose.

Will you (noble) madam, graciously receive these sincere expressions both of grief and regret, which, through me, the whole company of shareholders desire to express; and with feelings of heartfelt esteem and respect, allow me to remain, madam,

Your humble and obedient servant,
ED. CHOLMELEY,
President of the Council of Surveillance.
Rome, July 1st, 1869."

TREES IN KENSINGTON GARDENS.

THE treatment of trees in this now invaluable sanitarium, has lately attracted much attention. In the *Times*, a letter complains that "a wanton act was perpetrated in cutting down several of the finest trees (Scotch firs), just as they had reached their prime!" and again in Parliament the question was asked wherefore such spoliation had been done?

Any one used to plantations, or conversant in landscape gardening, and the effect of fine timber trees, would, on viewing the state of Kensington Gardens, say that the full-grown trees are too thick, being in many cases 12 ft., 10 ft., 8 ft., or even only 6 ft. apart; thus grown to a height of 50 ft. or more, without freedom for expansion, the stems are bare, or the branches interlaced, and the natural grace of arborage utterly destroyed thereby. In some parts it is a forest of deformed poles, with branches and foliage only on the top; many of them being decayed, lashing each other, from too close propinquity. Those afforested portions of the gardens are little frequented, as there is in reality nothing picturesque in their aspect; and, in fact, throughout the whole range, great improvement might be assured by *cutting away one full fourth part* of the deformed timber. This would give room for the survivors to spread their branches, and create a shade, and redeem from desertion the groves of stalky poles, so that an agrestic wanderer might recline and luxuriate there like Titerus, "*sub tegmine fagi*."

Now there are in these plantations very few Scotch firs, which are confined to only about one small acre in extent; where the five decaying trees were cut down, and where there yet remain 28 more of similar growth. This group is anything but ornamental, the stems being bare to the top, which has but little garniture. It may, however, by its hungry aspect, lend attraction to other competing groves, and it is certainly more open than the forested portions.

Many of the trees, being from 100 to 200 years growth, are nearly defunct, some actually so, and many more are partially decayed at the top. The dead trunks ought to be cleared away, and the decayed branches lopped; and, for the sake of improvement, and free growth of the survivors, a selection should be made of the least ornamental of the compacted centenarians for their removal, so as to give place to the free growth and development of this our urban forest.

By such treatment this range of 200 acres of timber trees might be rendered more accessible, agreeable, and certainly more graceful; but some competent landscape gardener ought to have control in the arrangement of all park plantations, if only to insure good taste in the selection of trees, so that places of public resort may not be deformed, as along the Cromwell-road, &c., by rows of poplars, which are the most formal and least graceful.

It is clear that some damage has been done by drainage in several places. A finely-expanded beech tree, which shaded a traverse of nearly 100 ft. near the S.E. angle, is withered; so also others of ornamental growth near to the fountains. Some of these drains were made in compliance with remonstrances from vicinal residents who crossed the ground daily, and complained of the plashy surface beneath the groves. Other deeper drains were made for the Serpentine Waterworks. Now the clearance of unsightly trunks of chestnuts from 200 to 300 years old would give more open air, more freedom of growth, and improved scenery; besides that these now intramural woodlands would be more passable and enjoyable. T. H. H.

BELLS FOR DISSENTING CHURCHES.

IN a former communication published in the *Builder*, of the 17th of April last, I endeavoured to show that churches of every denomination had a full right to use bells. At the same time it was intimated that those bells might be made use of in such a manner as to create a nuisance.

Now, it is known that many Roman Catholic churches in England have each one or more tower bells, while some of them possess a peal of five, six, or eight.

The following statement may, however, be news to most persons. Since the communication referred to appeared, Messrs. Mears & Stainbank, have informed me that they have cast bells for three Dissenting places of worship, namely:—

Trinity (Independent) Chapel, Poplar:—a bell weighing 10¼ cwt., A.D. 1842.

Independent Chapel, Hatherlow, Cheshire:—a bell weighing 7¾ cwt., A.D. 1853.

Unitarian Church, Todmorden, Lancashire:—a peal of eight bells in the key of F, the weight of the tenor being 14 cwt., A.D. 1868.

I may add that this last is a new stone Gothic structure, at the west end of which is a tower surmounted by an octagonal spire, standing out conspicuously on the hill side. The cost of the building was about 12,000*l.*, the whole of which, it is said, has been paid by Messrs. Fielden, Brothers, who have also defrayed the expenses of the bells and other furniture.

THOMAS WALESBY.

THE THAMES TUNNEL.

THE Thames Tunnel, which was opened on August 2, 1843, will be closed on Wednesday next, having thus been a public footway for a period of twenty-six years, less thirteen days. It has been purchased for 200,000*l.* (one-third of its cost) by the East London Railway Company, which line will be completed as far as Wapping in a short time. The new Thames Subway from Tower-hill to Bermondsey (Mr. Barlow's scheme) commenced on February 16th of the present year, is proceeding very rapidly, and, if all goes well, will be opened for traffic in three months' time. Its cost will be under 20,000*l.* The works of the old Thames Tunnel were commenced in 1825. Physical and financial difficulties delayed the opening for eighteen years. W.

LOW CLASS COMPETITIONS.

SIR,—Allow me to call the attention of your readers to the terms of a competition now pending for a Wesleyan chapel and schools at Doncaster. The requirements are a chapel to seat 1,000, schools for 500 children, many vestries, &c., for 4,500*l.* In the instructions are the following articles:—

"The building committee for the chapel and buildings will pay to the architect producing the design most approved by them the sum of 50*l.*, and for the second best in like manner the sum of 25*l.*, and such designs will become the absolute property of the committee, who may at their option employ either of such architects to carry out the designs, or otherwise."

"If the architect be so employed his *remuneration will hereafter be agreed upon*, and will include the premium approved design."

"The successful competitor will not be entitled to any prize or payment unless substantial contractors undertake to execute the work at a cost of not more than 10 per cent. above his estimate of the cost, which estimate must be sent in with the plans."

Unfortunately such conditions as these are not unusual in Dissenting chapel competitions, which fact goes far to account for the ugliness of the buildings produced; for it is quite certain that no established architect would compete unless he knew beforehand that it was arranged that the work should be given to him whether successful or not; for, in the first place, the committee will not approve of any designs which *can* be built for the 4,500*l.* in presence of many others much more showy and ornamented that *cannot* be carried out in their integrity for the money, made by persons who have no established character to lose.

Secondly, it is highly probable, even if the committee should choose a design capable of being carried out for the money, that the superintendence of the building would be given to some local architect (the committee have the power to do so by one of their conditions quoted above), who would thereby get the credit and remuneration justly due to the producer of the design.

Thirdly, if they employed the successful architect, by the second condition quoted above it is evident that they mean to haggle with him for his remuneration, or they would simply say the usual 5 per cent. would be given, about which there ought not to be any question.

The only architects likely to compete on these terms are articled pupils or clerks out of work, to whom 25*l.* for six or seven weeks' labour would be a great object; for the best way of surely gaining in this competition is to send in a showy design, which could not be executed for the money, with the object of getting the second premium, as the cost of the second design will not be severely questioned.

My attention was called to these conditions by a pupil who intends competing for the sake of practice; and for young fellows in his position the chances are favourable. The wonder is, that committees cannot see that by such conditions as these they appeal to the very lowest members of the profession, who have neither means nor powers for making good designs, nor character nor position which would render it unadvantageous to themselves for them to "do" their clients in any possible way.

M. M. G.

A SCHEME FOR THE CHANNEL RAILWAY.

THE following is a scheme for the Channel Railway, so that all the traffic is above water. To form a line of rails in the sea, from England to France. These rails are to be laid on arches, embankments, or some other suitable structure. The rails are to lie that far under water, that ships may pass without interfering with them. A skeleton framework of iron on wheels is to traverse these rails; this framework is to reach out of the water, so that the deck or platform on it is free of the ordinary tides. On this is accommodation for passengers, cattle, goods, &c.

The steam-engines to be placed on the deck and motion conveyed to the axles of the wheels by a vertical shaft. The screw-paddle wheels or hydraulic force may be also applied for propulsion. T. T. L.

TECHNICAL EDUCATION.

SIR,—Will you allow me a small space in your valuable, impartial journal, to make a few remarks, in answer to "Jack Plane's," on the late conference on the above subject. That much regret was felt that so little interest was taken in that important movement, I have no doubt. The gentlemen who introduced the scheme were trying to do good, but I fear they began at the wrong end. I will give a few reasons why: the first is, the masters in this age require men that can "work,"—not men with learning and skill; as I heard one master say to his men, "that he did not pay them for thinking; they must work, he would think." The second is, that men that spend the whole of their leisure time in study, naturally look for elevation from their present rank; and if you will only look in the advertising columns, you will see the field is overflowing already with (what they term themselves) competent and skilled men, and as there is not one out of every twenty builders in the country that has a foreman: if he has one, it is either a relation or a man that has no more money for it than the man that works; and some masters remark that they have "managed" before without, and they can still. The third is, the artisans are not likely to spend their time in learning, as there are a great many in the building trades (in London especially) that have not served one hour's apprenticeship. The way it is done is this: they reach about the age of twenty (a porter, perhaps, previously); they get a few shillings' worth of tools, and get a job in some building (they never go to a shop for a job), and "they do as others do." Then they do what they call "squaring" the foreman; that is, they give him 2s. or 3s., and sometimes even 5s., to stop on the job; and if there are too many on the job, it is these men that stop, as the dishonesty of the foreman keeps them in preference to others (however good workmen they may be), because, you know, it elevates his wages a great deal if there are five or six of this class of men, and that is a consideration to him. The fourth is, the masters have "managed" before without technical education, so they do not trouble themselves about it.

Indeed, I could give a great many more reasons, but I have almost taken too much space already; but I wish to suggest a scheme to which I hope you will give a helping hand. Skilled workmen ought to go through an examination the same as some professions; and if a building were hired or erected, and workmen go to work there under an honest and competent person or persons, and a certificate

given according to their capabilities, then the masters would be sure of "good" workmen. There should be two or three grades of examinations, and rewarded accordingly. Then I am sure there would be no deception, and there are plenty of workmen that would give one week gratuitously to gain the honour of being competent and trustworthy workmen. Architects would have competent clerks of works; builders would have skilled and competent foremen and good workmen; but, as the present system is, they have not, as there is not the least trial. Some of the greatest masters never see their men at work; they trust all to their foremen, who, perhaps, are no better than they should be.

I hope these few remarks will draw other pens on the subject, as it is one worthy of a trial, and I am sure it would answer. Both the master and man would be benefited by it; the bad workman riddled from them; and a happy termination would be the result. REASONER.

A GHOST IN THE BELFRY.

IN pursuance of my honorary occupation of inspector of public buildings, I was taking my usual half-holiday walk on last Saturday evening. Sauntering along Euston-road, I had come opposite the New Railway Station of St. Pancras, and was preparing to take a few rough notes of some glaring architectural incongruities in and surrounding that mighty structure. A circumstance, however, occurred which compelled me to put my note-book and pencil into my pocket, thereby postponing until another more opportune moment my impressions of the New Midland terminus. The disturbance of my masonic reverie was owing (to use the lines of Edgar Allen Poe) to—

"The tintintabulations of
The bells, bells, bells."

Where does the chime come from? quoth I; and I hurried along in the direction whence the sound proceeded, and in a few minutes I found myself opposite St. Pancras Church, facing Euston-square. The outer gates were closed, and the church doors seemed equally tight; yet the bells ding-donged, while a mass of spectators gazed and gabbled as they looked up wonderingly towards the clock-tower, striving to divine the cause of the rather unmusical chime in the belfry.

There was no one a-burying or a-marrying at five p.m., nor could any of the spectators tell what the anniversary was; neither could I. The secret soon transpired. A couple of men were employed that day in cleaning the church, and the sexton, forgetting their presence, had retired to his home in the neighbourhood, leaving them locked up in the galleries of the church. Unable to find an exit they bethought them that their best plan of attracting notice to their position would be to ascend the belfry and tug at the peal of bells. This expedient they successfully resorted to, and just at the moment when the strange rumour began to circulate among the masses outside that there must be a ghost in the belfry, the sexton arrived, and restored the prisoners to liberty. The announcement of the cause to the assembled multitude outside had the magic effect of eliciting peals of laughter, and of suddenly putting an end to the fanciful illusion indulged in, of "a ghost in the belfry."

A LOOKER-ON.

EXEMPTIONS UNDER BUILDING ACT.

SIR,—Police barracks are being erected adjoining the police courts, Clerkenwell. The builders say they are exempt under the exempted buildings clause; but this by a reference to those clauses would appear to be by no means clear: they cannot be held to be "*places of confinement*," but are residential dwellings for the police.

Such buildings should be fire-proof as far as practicable, and divided by party walls; and there appears no reason why they should not be subject to ordinary supervision and control. A SURVEYOR.

PRIZES OF THE INSTITUTION OF CIVIL ENGINEERS.

THE Council of the Institution of Civil Engineers have awarded the following premiums:—

1. A Telford Medal, and a Telford Premium, in Books, to M. Jules Gaudard, C.E., Lausanne, for Paper "On the Present State of Knowledge of the Strength and Resistance of Materials."

2. A Telford Medal, and a Telford Premium, in Books, to William Shelford, for Paper "On the Outfall of the River Humber."

*3. A Watt Medal, and a Telford Premium, in Books, to Zerah Colburn, for Paper "On American Locomotives and Rolling Stock."

4. A Telford Medal, and a Telford Premium, in Books, to Thomas Nesham Kirkham, for Paper "Experiments on the Standards of Comparison employed for Testing the Illuminating Power of Coal Gas."

5. A Telford Medal, and a Telford Premium, in Books, to John Eliacott, for "Description of the Low Water Basin at Birkenhead."

6. A Telford Medal, and a Telford Premium, in Books, to Professor David Thomas Ansted, F.R.S., for his Paper "On the Lagoons and Marshes of certain Parts of the Shores of the Mediterranean."

7. A Telford Premium, in Books, to William Henry Wheeler, for "Description of the River Witham and its Estuary, and of the various Works carried out in connexion therewith, for the Drainage of the Fens and the improvement of the Navigation."

8. A Telford Premium, in Books, to James Robert Mosse, for Paper "On the Mauritius Railway, Midland line."

9. A Telford Premium, in Books, to Imrie Bell, for Paper "On Sinking Wells for the Foundations of the Piers of the Jumna Bridge, Delhi Railway."

10. A Telford Premium, in Books, to John Milroy, for "Description of Apparatus for Excavating the Interior of, and for Sinking, Iron Cylinders."

11. A Telford Premium, in Books, to Samuel Parker Bidder, Jun., for Paper "On Machines employed in Working and Breaking-down Coal, so as to avoid the Use of Gunpowder."

12. A Telford Premium, in Books, to Charles John Chubb, for Paper "On Coal-getting Machinery as a Substitute for the Use of Gunpowder."

13. The Manby Premium, in Books, to David Marr Henderson, for Paper "On Lighthouse Apparatus and Lanterns."

The Council have likewise awarded prizes to six students of the Institution.

* Has previously received a Telford Medal.

THE DECAY OF STONE.

SIR,—The letter by "W. R.," in your issue of the 3rd inst., is apparently from the pen of a chemist, and not from a person practically acquainted with stone. The writer says I have fallen into a very common error as to the reason of the decay of stone. I can only say that if it be an error, it is one held by nearly all practical men who have made the decay of stone a subject of study. It was needless for me to state any particular description of stone to prove my argument, that most of the principal buildings in the neighbourhood of the quarries are in good preservation, and that buildings erected in London of similar stone were more or less in a state of decay, because it applies to all. The exceptions prove that the rapid decay is caused principally by want of proper selection. I contend that all the principal quarries produce beds of stone which, if properly selected, the defective parts cut out, and the stone properly bedded, will stand the destructive effects of the London atmosphere for many centuries. Any practical stonemason will tell "W. R." that it is most important to employ workmen who understand the stone they are using.

With respect to atmospheric causes of the decay of stone in towns, no doubt the gaseous contamination of the metropolis and manufacturing districts does cause the stone to decay quicker than in the pure air of the country, where the stone soon becomes covered with lichens, which protect the stone. At the same time, when we see buildings of Portland and other stones which have withstood the destructive effects of the gases for a great number of years, we must attribute the rapid decay of others built of the same stone to the causes stated in my paper, the want of proper knowledge of the subject on the part of the architect, builder, and stonemason. The theories of "W. R." as to the unsuitability of the magnesian limestones to withstand the atmosphere of towns are not proved by practice; take, for instance, the Mansfield stone, which has been used largely in London for many years, and which stands admirably.

The chemical analysis of a stone is very useful to aid the inquirer in arriving at the proper merits of any particular stone, but it is most unwise to condemn the Bulwell or any other kind of stone simply from the chemical test of a few specimens proving unfavourable in the opinion of "W. R." acting on certain theories of his own. It does not follow that, because a stone is porous that it must therefore decay quickly: the Little Casterton Freestone is a very porous stone, but it stands the weather well. A stock brick will suck up a large quantity of water, but it resists the action of the weather notwithstanding.

A stone which withstands the weather well will generally exhibit, when broken, a clean fracture free from dust, and, under a powerful magnifying glass, show the particles of which the stone is composed to be firmly cemented together. Granite, like every other description of stone, is of two qualities, good and bad; it is a mistake to suppose it to be an imperishable material. In some parts of Devonshire may be seen the stone from the carboniferous formation in excellent preservation, while the granite by its side, built in at the same time, is much decayed. "W. R." does not seem to be aware that one of the principal ingredients of porcelain is decomposed granite.

I trust some of your numerous practical readers will give their opinions and experience on this most interesting and important subject. ARTHUR C. PAIN.

"*OLD* ST. PETER'S AT ROME." NORTHAMPTON.

SIR,—Some eight years ago I inserted in the *Gentleman's Magazine*, then in the old, and I must think better, guise I had known forty years before, a query I had never seen mooted, but which I think obtained no response then; so might be reproduced in the still more suitable pages of the *Builder*. "What is known about *Old* St. Peter's at Rome?"—that is, the immediate predecessor of the present magnificent structure?

For it were strange if there were no authentic Roman records or traditions here, when we know so much about our "*Old* St. Paul's," for several centuries before its destruction; also the history and stages of our minor cathedrals. Was this, then, "Roman," or "Gothic?" and if the latter, of what date and style? What its size, or thereabouts, leading features, and principal objects of interest?

Also (though I have done with "campanology" now, after far from an idle career), where and what are the *bells* of the present church, since all know there is no distinct "campanile" any more than tower, in plan?—a question which can be answered by favoured Mediæval observers. In a *single* fine large old, probably very rare "close" view I have seen them portrayed, suspended in the upper (unglazed) *windows* of the west front. In some accredited "Travels,"—I think not the amiable Eustace's,—I have read of a "peal of bells" ("chimes," probably, had been the better word) here; also of a "clock" bell of some 19,000 lb.,—a little heavier than our "Great Tom," Oxford.

As you say, sir, in your very interesting "Northampton Note," All Saints' Church is "hybrid," though stately, with full-length western colonnade, a rare feature. In plan, with added chancel, it is partly approached by "Whitechapel," or "St. George's, East," but is more imposing. Its communion "Moses and Aaron" was, I believe, by Kneller; and the pulpit, with eagles and wreaths, is (or was) a fine piece of carving, hardly to be exceeded, if matched, in England. It is one poor comfort in declining turbid life* that, I think, I was a main cause, by two letters in the *Northampton Mercury*,—the second especially noticed,—of "concrete" being laid down here, on some recent alterations: thus converting what had been architecturally termed a "charnel-house"—from painful effects,—into a wholesome, or, at least, safe building. I am happy to know that this (with added charcoal) has been done, under other influences, in all or most London "City" churches; and, doubtless, is worthy of attention in any provincial contingencies. J. D. PARRY.

* For one unfortunate cause, see *Builder*, June 13th, 1868, "Woburn Abbey."

THE EDDYSTONE.

BENEATH the bright blue sea, off Plymouth Sound,
And somewhat northward of the line that joins
The Start and Lizard points—right in the course
Of out- and homeward-bound and coasting ships—
There lies a rock of adamantine gneiss,
Two hundred fathoms long, one hundred broad,
Three long serrated reefs, three bristling rocks,
And channels deep between, are seen at ebb;
And whirling swiftly round the reefs and rocks,
The rippling tides in circling eddies flow.

When wild Atlantic winds the seas enrage,
The rock th' assaulting waves repels, and churns
To founts of foam and spray that skyward leap,
And thence in overwhelming cataracts fall;
And woe to ship and crew if storm and surge
Should drive them on the rock. In calm and storm,
Before a mark by day and light by night
Were set thereon,* the mariner to warn
Of danger lurking 'neath his trackless path,
It often was the cause of fearful wrecks,
Of which some were so direful and complete,
That not a soul survived to tell the tale.

But other scenes than these it oft has seen,—
The sailing past it of that gallant host,
With Edward's son, who won the glorious fight
At Poictiers; of Hawkins, Raleigh, Drake,
And many other worthy Devon braves,
Who spoil'd the gains and crush'd the power of Spain;
Of that great fleet that Spain against the faith
And liberties of England hurl'd in vain;
Of that God-fearing giant-hearted band,
The Pilgrim Fathers—who those liberties,
And faith, transplanted to New England soil;
And of the noble Blake, with his brave fleet,
Soon after he the batteries had destroyed,
And Silver Fleet had sunk, at Santa Cruz.

JOHN PHILLIPS.

* Four lighthouses have been built on the Eddystone, all by private enterprise. The work of each was executed under most trying difficulties, which were surmounted only by the exercise of indomitable pluck and perseverance. The first and second lighthouses were designed and erected by Winstanley; the third by Rudyerd; and the fourth by Smeaton, a name ever to be honoured and esteemed among engineers. The superstructure of the first was taken down early in 1698, the year after the building was completed, owing to its want of strength to resist the shocks of the waves against it, and its want of height; the second, which resembled a pagoda, was swept clean away, together with its architect, some workmen, and the lightkeepers, by a dreadful hurricane, 26th November, 1703; the third, whose form was that of a truncated cone, was destroyed by fire on the night of the 1st of December, 1755, owing to the negligence or worse of one or more of the lightkeepers; and the fourth, whose form is that of a sturdy forest oak, with its spreading base and tapering bole, remains, not only a proud and lasting monument of the skill and energy of its designer and builder, but a model, both as to form and construction, for similar buildings all over the world. The outward-bound mariner makes it his point of departure, and the homeward-bound mariner his point of return. When, speeding outward over the yeasty billows, he sees it fade and sink below the horizon behind him, he waves it his silent farewell; and when, speeding homeward, joyous and light-hearted, with crowding thoughts of "England, Home, and Beauty," he catches sight of it again rising over the horizon before him, the cheer rings out of "The Eddystone!"—J. P.

THE USE OF MATERIALS IN DESIGN.

THE legitimate influence materials should have on design is a consideration often entirely unthought of by our architects; indeed, our present system of architectural education disregards any special application of design, based as it is, as a rule, on a knowledge of styles and precedents, and the measuring and drawing of old buildings. It is quite time a new *régime* should supersede this irrational and senseless mode of instruction, or, at any rate, leave it to the after study of our students.

Your recent article on the "Use of Plaster in Decoration" is so entirely concurrent with my own views, that I may be permitted to say a few words on the subject.

Our architects have to consider design (1) in its relation to purpose or arrangement; (2) in relation to structural conditions; (3) in relation to ornamentation. Underlying, as it were, each of these initial conditions—at least, the two last—are the materials we use. Their influence over them, and over art generally, must, to a greater or less degree, predominate. It is useless to ignore the fact; we may try to conceal or counterfeit the material as we like, but the logic of fitness confutes us,—the result betrays the deception, and with what consequences to art, the history of pseudo-classic and post-Gothic art abundantly testifies.

The reaction of the revival of ecclesiastical art, Pugin's denunciations against shams of all kinds—plaster and paint notably,—opened to us a new anti-sham era of architecture almost before we had time to consider the proper value of elements then in use. The revival was truly the salvation of architectural art, but it resuscitated the semblance and features of an *effete* style more than the *motif* or *rationale* that gave it birth. Having the one without the other, the spirit of modern thought cannot possibly find that correspondence in it which the fond labours of a Pugin or a Britton had hoped. Hence we

have got a sort of an anachronism, at the best, that discourages persistently shams of materials and workmanship, and which has in this way done an immense amount of good to art generally, and to architecture in particular. But because we prefer to see our church walls interiorly divested of plaster, and our woodwork of paint, we must not, I think, reject or eliminate those materials altogether as useless abominations. There has been an *abuse* of those materials in making them represent other materials, but this must be looked upon as a misapplication of the properties and capabilities of plaster and paint, and not as a reason for their being counted shams or "abominations" in themselves. The great mistake, as the writer of the article hints at, is in making plaster, for instance, do service as a durable material, and in this light expending on it the design and artistic labour of carved stone or wood. In the matter of plaster cornices and internal decoration generally this mistaken conception of the qualities and duties of plaster must be apparent. Running, impressing, or *simple* casting are the only methods legitimately sanctionable in using this material decoratively. The first is perhaps the simplest mode of applying plaster to the upper angles of rooms, and if the members are artistically grouped with ample rests or plain surfaces for the relief of the eye, "run" cornices are as effective as those cradled down and blocked or modillioned. The introduction of modillions and blocks is certainly indefensible, because it gives the cornice a constructional importance which a plaster cornice cannot possess, and it gives to plaster itself an assumption of cohesive strength equally false. The method suggested in the article on this material is one that must ultimately take the place of the flimsy and meaningless "agglomerations" of plaster, and enrichments that now find admittance even in first-class residences and public buildings erected from architects' designs. The plan suggested I have often thought of,—in fact, I do not see why the inserted ornament in the angle hollow of cornices should not be made of perforated wood cut out to the design intended, which should be always more or less conventional.

The diapering suggested to the surface of ceilings would vastly relieve the monotony of whitened plainness that now usually prevails in ordinary houses and buildings. Till a material more yielding and tenacious than plaster be found, we must accept that as a vehicle for finishing our walls and ceilings, and as a fire-proof and non-conductive medium of some value. We might extend the same argument to paint as a preservative material, though it is a question whether it should be employed representatively in architecture at all, but rather conventionally in a decorative sense.

G. HUSKISSON GUILLAUME.

PROPOSED DOCK IMPROVEMENTS FOR GLOUCESTER.

Two schemes of great importance as regards the trade of Gloucester, the Bristol Channel, Dean Forest, and South Wales, are now engaging attention. A plan of improvement has been proposed by Mr. Clegram, the resident engineer, and endorsed by Mr. T. E. Harrison, a London engineer, for an extension of the Gloucester and Berkeley Canal, from a point one mile above the present outlet to Holy Hazle Pill, three-quarters of a mile below. By an outlay of 150,000*l.*, according to our authority, the *Gloucester Chronicle*, a new entrance can be provided, with a tidal basin 700 ft. long and 300 ft. wide; inside this, a dock 2,000 ft. long and 355 ft. wide; and an extension to the existing canal 700 ft. in length, 150 ft. in width at the top, and with a depth of water of 19 ft. Thus accommodation would be given for the largest ships that can navigate the estuary of the Severn from King-road to Sharpness. This scheme is regarded as offering the greatest improvement of which the port of Gloucester can at any time be capable. The Board of Trade has been consulted, and it is understood that the president, Mr. Bright, approves the plan. As the site is only some four or five miles from the trunk line of the Midland Railway, the docks and the line might easily be brought into communication.

The other, and somewhat kindred, project is the connexion of the existing railways, east and west of the Severn, by a direct line, instead of having to go all round by way of Gloucester. A plan has been suggested for making a subway from the Severn and Wye Railway to a point near the proposed docks at Holy Hazle Pill. This, it is said, could be done without interference with the traffic on the river, and it would materially lessen the distance between the metropolis and the Dean Forest and South Wales coal-fields, while the result of a recent survey is said to be the calculation that by the construction of the new docks and of the subway, the Government mineral and woodland property in Dean Forest, 25,000 acres in extent, would be improved to the value of 40*l.* an acre, or in all 1,000,000*l.* sterling. The cost of the subway is set down at 250,000*l.*, not more than a third of the cost of the gigantic bridge at Oldbury, and not greater than that of the Newnham bridge. It would connect the South Wales and Midland systems, and would afford a constant export trade in coal and iron from the contemplated docks at Holy Hazle Pill. If the docks are constructed and the subway is made, ships will be enabled to load at Holy Hazle Pill, and the consequent improvement in the value of the Forest of Dean coal-field will be enormous. It is, therefore, stated that the Office of Woods and Forests is willing to recommend a loan for the construction of the subway.

The Gloucester and Berkeley Canal Company, it is said, will shortly decide whether they will apply to Parliament for powers to carry out so much of this great work as they are immediately interested in.

CHURCH-BUILDING NEWS.

Hertford.—Christ Church, Port Vale, Bengeo, has been consecrated. The style is Geometric Decorated. The church consists of nave, chancel, south aisle, north and south transepts, organ chapel, and vestry. The plan is cruciform, and is arranged to admit of lateral extension by the addition of an aisle on the north side, and the elongation of the north transept. There are two entrances, viz.,—one through a porch on the south side, and the other through a moulded doorway near the vestry on the same side, which also forms the entrance to the vestry. At the north-west corner of the nave a bell-turret of characteristic design rises out of the buttresses, which are carried up of greater width and projection than the other buttresses to form a base for the superstructure. The lower part is carried on disengaged circular shafts placed in the angles formed by the junction of the buttresses. These shafts have moulded bases, bands and carved caps from the top of which the turret begins to rise, the canted sides being gradually enlarged by corbelling out until the turret forms an octagon on plan. Above the gable of the nave roof, the bell-story is formed by a light arcade composed of stone shafts, with moulded bases, and carved caps over which are trefoil-headed openings on each of the eight sides surmounted with carved gablets, and a stone spire with an ornamental vane at the apex. The south window is a combination of two two-light windows under a single arched head filled in with tracery: the spandrels and caps of shafts are carved. The chancel has an apsidal end divided into bays, with single light windows. The roof is formed with moulded arched ribs, stained and varnished, springing from stone shafted corbels, and the intermediate spaces, or panels, are carved or coloured blue. The chancel arch is of large span, and lofty in proportion; the jambs have banded shafts in the angles, with carved caps, carrying a moulded arch. The nave and other roofs are open timbered, and are formed with principal rafters, and carved, moulded ribs springing from stone corbels. All the timbers are wrought, and covered with boarding and felt laid horizontally, the whole being stained and varnished. The seats are low, open benches, with cut bench ends, stained and varnished. The aisles are paved with black and red tiles laid in patterns diagonally. The windows generally are glazed with green cathedral glass, and chancel windows with rough plate-glass, with *fleur-de-lis* pattern or quarries. The whole of the stone carving has been executed from natural examples. The architect was Mr. Thomas Smith, of Hertford; and the works have been carried out under his superintendence by Mr. Harris, the contractor.

Barcheston.—The ancient Church of St. Martin, at Barcheston, is now in course of restoration, from plans furnished by Mr. Ewan Christian, of London. In the work of restoration as much of the old work as possible will be retained. New roofs to the chancel, nave, and two aisles will be provided, and new seats throughout. The work will be done by Mr. Alfred Groves, of Milton, near Chipping-Norton.

Avon Dassett.—The new parish church has been consecrated by the Bishop of Worcester. The new building consists of a nave, 44 ft. long by 17 ft. in width; north aisle, 44 ft. by 10 ft.; entrance porch to the south side, western tower, and chancel, 34 ft. by 16 ft. On the north side of the chancel are the organ chamber and vestry. The style is Early English. The chancel, which is on the site of the old one, is laid with Godwin's tiles. The chancel stalls and seats are of carved oak, most of which was given by the late Rev. W. C. Risley, of Deddington. The reredos is of Purbeck marble. The north arcade of the church is a restoration of the old arcade, which was of the transitional date between the Norman and the Early English. The old church was in a very ruinous state, and very little of it was worth retaining; but that which was of any consideration has been replaced in the new church. Among the things retained is the tomb of an ecclesiastic of the thirteenth century, which, under a fourteenth century canopy, has been replaced in the chancel. The west window of the tower, too, is one of the retentions. The tower and spire rise to the height of 125 ft. The principal entrance to the church is by a porch, which is about 25 ft. above the level of the road, and reached by a flight of temporary steps. It is intended to erect oak gates, in keeping with the style of the church, at the entrance to the churchyard. The church is roofed with brown Staffordshire tiles. The seats are low-set benches of varnished deal, which can be moved about at pleasure. The roof internally is of plain tile, while that of the nave and aisle is of Baltic timber, neither stained nor varnished. The body of the building is laid with red 6-in. Staffordshire tiles. The font is of Purbeck marble. The warming of the church is accomplished on Mitchell's warm-air principle; that is, small fire-pits are placed at intervals under the floor, connected with a flue, which has been carried out by Mr. Hudson, of Leamington. Through the instrumentality of the Rev. W. C. Holbech, who, besides, has contributed a great portion of the stone for the building, a peal of five bells has been obtained. They were furnished by Mr. Blews, of Birmingham, who also presented the altar candlesticks, which were designed by the architect. Towards the entire cost 2,400*l.* have been subscribed.

St. Michael's, Radnorshire.—The parish church of St. Michael's has been restored and reopened. The fabric had been condemned as dangerous some nine or ten months since, and had consequently been shut up, and when the work of restoration was commenced, so neglected had it become, that ferns and lichens were growing in almost their native wildness in many a crevice within. The building itself is one of those little "mountain churches" one is accustomed to stumble across on our hill sides. It is in the Early Pointed style of architecture of the thirteenth century, and consists of nave, chancel, south porch, and tower, the latter a massive structure with walls thick enough for a "donjon keep," or for the confinement of a state prisoner. Its restoration is now completed. The architect has copied as far as practicable the original structure in all its details. The outside coating of whitewash has disappeared, the joints of the stones have been repointed, a new roof with ornamental ridge tiles and iron finials has been put on, and a new porch has been erected. Inside the building has been treated in the same manner. The walls have been scraped and cleaned, new windows (Early Decorated) have been inserted. The roof of the chancel has two depressions, the second, or lowermost, over the sanctuary being canopied like Brilley Church, close by. The chancel originally possessed a double screen. The roofs were ceiled; they are now opened out, and the old wood-work has been allowed to remain wherever practicable; the rafters of the nave were all pretty sound, but in the chancel nearly all the woodwork is new, stained dark to match old as nearly as possible; the whole, including the screen, has been newly varnished. The old "ramshakle" pews have been swept away, and seats of varnished pine placed in their stead, free and unappropriated. There is a new pulpit wrought in Farleydown stone, and pierced and fitted with an oaken reading-stand. The font is a plain, solid specimen of hollowed stone. The architect has given a small east window of stained glass.

Huttoft.—The parish church at Huttoft, which was in a very dilapidated state, has, through the exertions of the vicar, the Rev. G. Bryan, been restored, and it is now reopened for divine service. The fabric was in a sad state, showing

many years of neglect. The upper portion of the chancel arch was blocked up with masonry, and a ceiling thrown across the chancel; two or three windows were likewise blocked up, and the stone mullions of others had given way to the domestic lead and iron work of modern times. The rood steps had been hidden with mortar. The north wall was in a dangerous condition. The mullions in the six south windows were replaced with wood casements. The floor was partly common brick and partly hardened mud; and the gallery, though useful, had an unseemly appearance. The exterior of the building had a somewhat motley appearance by the decayed stonework being in various places repaired with bricks, and the roof of the porch was covered with red tiles, &c. There has been, however, a restoration in all of these particulars, and the entire restoration fund was about 600*l*.

Whaddon, Cambs.—The parish church of Whaddon has been reopened. With the exception of the tower, the edifice, which is in the Gothic style, has been completely restored: the outer walls have been refaced with pebbles, edged with stone, and new windows and a porch added; the walls of the interior are replastered, and the stone pillars renovated; the roof of the nave has been restored, those in the north and south aisles being new, as also that of the chancel. The floor is paved with red and black encaustic tiles, worked in large squares. A new lectern, reading desk, and carved oak pulpit have also been supplied; and the seats are for the present temporary, in consequence of the want of funds, which is also the cause, we understand, of the tower not being restored in correspondence with the remainder of the building. The lead on the the roof has been recast and laid afresh. What has been done in the chancel will be defrayed by the Ecclesiastical Commissioners, who are the patrons of the living; that part of the edifice has had new oak choir-seats placed in it, a new altar-rail, &c. The communion-table was covered with a purple velvet cloth, with gold fringe; and the reredos was adorned with crimson cloth, above which appeared a three-light stained glass window, the gift of a gentleman in the parish. Beneath the new organ-chamber is the furnace for the hot-water apparatus, which is to warm the church when necessary by means of pipes traversing the various walls; the pipes are 1¼ in. in diameter. Two coils of pipes, covered with iron pedestals, are placed at the tower end, and in the chancel the pipes are covered with iron trellis work. This portion of the work has been executed by J. L. Bacon & Co., of London. "The poor man's window" was contributed by the poor of the parish; it is in stained glass. The cost of the restoration is estimated at about 2,300*l*. The builder employed was Mr. Brown, of King's Lynn, and the architect Mr. Ewan Christian, of London.

Manston.—The chancel of the parish church has been restored and beautified at the expense of the rector, the Rev. E. Anderson.

Milborne Port.—The parish church has been re-opened for public worship, after having undergone considerable alteration and enlargement. The building had been allowed to fall into a crumbling dilapidated condition in many parts, in addition to which there was scarcely adequate accommodation for the parishioners who attended divine service. The cost of the work done amounts to about 4,000*l*. Mr. Alfred Reynolds of this place, was the builder employed. The work has all been carried out in accordance with designs prepared by Mr. Henry Hall, of London, architect. The nave has been extended 28 ft., with two additional bays, whilst an aisle has been constructed on the north side, where an unsightly excrescence only before existed. Added to these improvements is a new roof, whilst the stained windows and ornamentation of the interior throughout give to the place quite a different appearance from heretofore. The foundations of the structure are of forest marble, which was brought from Toomer-hill, near Milborne Port, and above the string-course the building is of local stone, with portions of the old material worked in, and the dressings are of Ham-hill stone. Two Perpendicular windows have lately been inserted in the chancel aisle, with buttresses surmounted by foliated pinnacles. The buttresses are as yet unfinished, the blocks left being no doubt intended to receive ornamentation. A window has been inserted in the east end of the chancel, beside which is a small lancet-headed window of Early English character. The south transept was rebuilt a few years ago, and only a partial restoration has now been found necessary. The large square tower stands on four late Norman tiers, and is battlemented, with pinnacles at the angles. The roof of the nave is covered with slabs of local stone, with a cresting of Ham-hill.

Hull.—The foundation stone of the new church of St. Silas has been laid, in the parish of St. Paul. The site of the building is in Barmston-street, on an open space of ground in front of the Kingston Cotton Mills. The church will comprise a nave, with north and south aisles, chancel, vestry, organ chapel, and tower. The nave will be divided into five bays by circular columns of Bath stone, with wrought moulded caps and bases, and having brick arches set in pattern. The chancel will be 26 ft. by 23 ft., terminated octagonally, and will have three two-light windows. The altar will be under the centre window, and be raised five steps above the nave. The exterior of the church will be of brick, with stone dressings. The tower will be opposite the end of Lincoln-street, and form a principal feature in the design, and is intended to be surmounted with a slate spire, having wood Lucerne lights, of ornamental design. The building is designed in the first period of Gothic architecture, and is to be carried out under the superintendence of Mr. Samuel Musgrave, architect. The contractors are—for brickwork and plastering, Mr. Musgrave; carpentry and joinery, Mr. Sissons; stonemasonry, Mr. Sweeting. The Clerk of the Works is Mr. Hull. The estimated cost of the building is upwards of 3,000*l*.

Battle.—St. Mary's Church has been restored and opened for divine service. The architect was Mr. W. Butterfield, of London, and the work has been carried out by Messrs. Gaskin & Godden, of Canterbury, at a cost of about 4,000*l*. The work has not yet been thoroughly completed; the tower is as yet untouched, and it is estimated that about 1,000*l*. are needed to complete the work. The Lady Chapel has been entirely restored, and the eastern portion screened off to form a vestry. The east window has been removed, and replaced by three lancets. The roof is for the most part new, and the exterior walls have been completely restored, excepting those of the tower. In the interior various changes and improvements have been effected. The old gallery has been removed, and the western arch thrown open. The floor of the church has also been lowered throughout, rendering the interior more imposing in its height. The old-fashioned pews have been replaced by modern seats, composed of oak, and the interior has been fitted up with apparatus for heating by hot water. Seats are to be appropriated in all parts of the church, but every third bench is to be for the free use of the parishioners. The sanctuary and chancel are paved with Minton tiles, and the tiles of the nave are by Peake. The carving of the foliage around the pulpit is by Mr. Earp, of London. Two new bells have been provided by extra subscription among the parishioners, and a new organ has been built by Messrs. Bevington & Son.

SCHOOL-BUILDING NEWS.

Walsall.—The memorial stone of a new Baptist school, which is to be erected near the corner of Stafford-street, in this town, has been laid. Want of accommodation in the chapel and the school, it seems, has been felt for years; and last year it was resolved to erect new school-rooms to accommodate 700 children, and to renovate and enlarge the chapel so as to seat 250 more persons, or in all to seat 750 people. The estimated cost of the whole, when finished, is over 1,600*l*. During the time the buildings are in progress Divine service will be held in the Temperance Hall, Freer-street. The designs of the new schools have been prepared by Mr. Ingall, of Birmingham, architect; and the building will be erected by Messrs. Trow & Sons, of Wednesbury, builders. The schools will be of a very plain character, and are to be built of brick, with stone dressings, and very little ornamentation of any kind.

Stoke.—The corner-stone of a new Sunday School building attached to the Baptist Chapel at Stoke-upon-Trent has been laid. The new building will accommodate about 400, with rooms for infants, senior children, and adult classes. The plans had been prepared by Mr. E. Penn. Mr. Nathan Barlow, of Stoke, is the contractor. The entire cost of the school, including heating-apparatus, gasfittings, and furnishing, will be about 600*l*., which, with alterations necessary to be made in the chapel, will amount to 660*l*.

Sandy (*Bedford*).—The new national schools which have been just erected at Sandy, through the exertions of the rector, the Rev. J. Richardson, have been opened with some ceremony. The school building is situated on the outskirts of the town, and within easy distance of the church. The halls, of which there are two, are at right angles, and severally measure internally 56 ft. by 20 ft., being calculated to accommodate 150 pupils each. The main block is flanked on either side by residences, one for the master, and the other for the mistress, the whole of the premises occupying a site of about half an acre, inclusive, however, of an area in front, which is to be devoted to the purposes of a play-ground. The estimated cost of the entire erection, independently of the site, which has been given by the rector, amounts to 1,700*l*. The architects were Messrs. Habershon & Pite, of London; the builder, Mr. Field, of Sandy. The style participates of the Gothic character.

Stroud.—A school, with service-room, has been built at a cost of 500*l*. The architect was the Rev. W. H. Lowder, whose quaint designs have been carried out by the contractor, Mr. Restall, of Bisley. The dimensions of the building are—length, 61 ft.; breadth, 18 ft.; height of walls, 11 ft.; class-room, 16 ft. square, and of the same height. The whole cost of the building, and also of a teacher's residence adjoining the school, was defrayed by Mrs. Keble, of Bisley.

PROVINCIAL NEWS.

South Shields.—The Post-office authorities have decided upon taking premises in Dean-street, adjoining Messrs. Wright's new buildings, for the purposes of a post-office, and the necessary arrangements will at once be made for effecting the required alterations. It is intended to pull the old building down, and upon its site rear a new erection, with all requisite accommodation for carrying on the postal business.

Epworth.—During the last two or three years the market town of Epworth has greatly improved in appearance. Many unsightly and inconvenient houses have been pulled down, and new habitations erected in their places. The boundary wall around the New Connexion Chapel and the new Temperance Hall, in High-street, have improved the appearance of the street, which a short time ago was considerably widened. A double row of flags is being laid on a part of the footpath, and the channel has been relaid. The Gas Company are carrying their main pipes along the whole length of the town, and the town will be lighted during the ensuing year, not partially, as heretofore. The town will be brought under the Lighting and Paving Act, and not be dependent on voluntary contributions, or a voluntary rate. Other improvements have been effected; and what is now most required is a new and commodious market-house. As soon as a suitable site can be secured, the building will be erected. Epworth being essentially the capital of the Isle of Axholme, a market-hall is necessary for the accommodation of those attending it. Amongst other improvements is the renovating and repairing the parish church, and others are in contemplation.

FROM SCOTLAND.

Glasgow.—The erection of the new university at Gilmorehill is steadily proceeding. Outside the buildings, the ground fronting the eastern elevation is being brought into order and neatness. It is now about two years and a half since the erection of the new university was commenced, but it is not expected that the halls will be ready for occupation before autumn next year. The eastern front, which is to be used as class-rooms, is the furthest advanced portion of the buildings. It has been under roof for several months, and the internal work is now being carried out. The octagon laboratory, at the south corner of the eastern front, is in the same forward state. The south front, forming a continuation of the students' class-rooms, has also been roofed, with the exception of the wings, between which is the central tower. These wings are, however, nearly ready for being covered over. In the north front, set apart for the library and museum, &c., the angle towers have been roofed, with the exception of the north-west one, which is not yet so far advanced. The library is externally complete, and the erection of the museum and reading-room has been carried to the commencement of the second floor. The founda-

tions for the great hall, which is to connect the northern and southern divisions, and to form the central space into two quadrangles, are nearly completed, as are also the foundations for the carriage-drive entering the great hall from the north. The erection of the dwelling-houses for the professors, to the west of the university, is also making progress. There are here a range of seven houses, three stories in height, and in addition, there are four in the north front, and two houses, including one for the principal, at the south end of the west block. Provision is being made for the heating and ventilation of the various halls and class-rooms.

Books Received.

Wrought-Iron Bridges and Roofs. By W. Cawthorne Unwin, B.Sc., C.E. London: Spon, 1869.

THIS volume contains a series of lectures delivered at the Royal Engineer Establishment, Chatham, to the officers of the Royal Engineers under instruction there; and they were afterwards printed at the press of that establishment for private circulation. That they proved useful to those for whom they were originally intended we have no doubt, and they are now offered in a revised and re-arranged form to a wider circle of readers. The author assisted Mr. William Fairbairn in some of his many researches, and the work is dedicated to him. It is illustrated with examples of the calculation of stress in girders and roof trusses by graphic and algebraic methods. The author has restricted the use of symbolic expressions as much as possible; and the work holds an intermediate place between practical and theoretical treatises.

VARIORUM.

"CHANNEL TUNNEL: Statement and Reports. Savill & Co., Printers, Chandos-street." In the form of a pamphlet we have here a statement of the executive committee, with engineer's report, and diagram; also address presented by the committee to the Emperor of the French, at an audience on June 17th, 1868; and report of the special commission appointed by the Emperor to examine the project.——"On the Supply of Animal Food to Britain, and the Means proposed for Increasing it. By Wentworth L. Scott, F.C.S., &c. London: Sampson Low & Co., Fleet-street." This is a reprint of a paper read before the Society of Arts in February of last year, and noticed by us at the time.——"The Duties of a Royal Engineer Officer in Time of Peace, for the Organisation of the Staff of an Army. Buck, Paternoster-row." A wide range of details is comprised in this pamphlet. It deals *inter alias* with the position and duties of surveyors and clerks of works, in relation to officers of the Royal Engineers, and suggests various reforms. It deserves to be read.

Miscellanea.

Compensation.—An arbitration has been held before Mr. George Pownall to assess the compensation due by the Midland Railway Company to the Duke of Norfolk, for land required to be purchased from his Grace between Heeley and the junction with the Sheffield and Rotherham Railway. The claim was divided into freehold land not on lease, severance, reversions of land, and compulsory sale. These items the advisers calculated at 76,215*l.* altogether. The witnesses summoned on behalf of the company made the amount 41,371*l.* The award of Mr. Pownall has now been made, and it amounts to 47,333*l.*

Compensation Gate and Door Closer.—An invention has been patented by Messrs. P. & J. Nimmo, of Edinburgh, for closing either the heavy doors of banks, public buildings, churches, &c., or the interior doors of dwelling-houses, as well as garden and other gates. The power by which it acts is obtained from balance weights. As with most other door-closers and springs, when fitted, it is placed under the heel of the door, and forms the lower hinge, on which it turns. As the door moves on its hinges in opening, a pinion, fixed on a vertical stand or spindle, engages with a curved rack or lever, and lifts a balance-weight. On the door being released, this weight falls, and brings back the door by the same means.

New Masonic Hall, Sunderland.—The foundation stone of a new Masonic Hall has been laid in Park-terrace, Sunderland. The total estimated cost of the building is a little over 1,500*l.*, which will be provided by the Sunderland Masonic Hall Company (Limited).—The design of the front elevation shows a white brick building, with stone dressings, in harmony with the remainder of the buildings in the row, which faces the new Park. The front will be pedimented with three tiers of three light windows. Above the second, or ground-floor window, is a projecting balcony opening out from the club-room on the upper story. The principal entrance is at the side. Ascending by a flight of seven steps, there is an Ionic portico, with columns on each side, and from the portico three steps lead to the entrance-hall. From the entrance-hall is a descent by a flight of steps to the basement floor, in which is situate a kitchen 24½ ft. by 13½ ft., and 13 ft. in height, in which will be a large cooking apparatus, capable of providing for 150 people. Immediately behind the kitchen is the refreshment-room for the use of the brethren, 25 ft. by 42 ft., and 17 ft. in height. Here the Masonic dinners will be held, and this room can be let for meetings of Free Gardeners, Foresters, Oddfellows, and other kindred societies. It will hold comfortably 150 people. On the ground-floor, in the front of the building, is a waiting-room of the same size as, and immediately above, the kitchen, and 12 ft. in height; this will be subdivided on lodge nights for Masonic purposes. Two double doors, one on each side of the fireplace, open from this waiting-room to the lodge-room immediately behind. The dimensions of this room are 25 ft. by 42 ft., with a height of 21 ft. It will be ornamented with Corinthian pilasters and full Corinthian columns. At the east end will be a raised semicircular dais, ascended by three steps, and ranged round the semicircle will be placed seven chairs in the form of stalls. The room will be lighted with gas, and ventilated by the patent ventilating sun-lights, and it will not be used for any other than Masonic purposes. Above the waiting-room is the club-room, of the same dimensions as the one beneath. The building has been designed by Mr. John Tillman, architect, and will be carried out by Messrs. T. & A. Cooke, contractors for masonry; Mr. Thomas Armstrong, for joiners and carpenters' work; Mr. Thomas Atkinson, for plumbers and smiths' work; Mr. Dauber, for slating; and Mr. Thos. Godfordson, for painting.

Improved Action in Pianofortes.—It is surprising that the piano should still be defective in its action, but such is the fact, and therefore improvements in it are of interest to every household. The space allotted at the South Kensington Museum for the exhibition of musical instruments, in which are combined the latest improvements, is at the present time crowded with many specimens. Prominent amongst these is a piano fitted with a new check-repeating action. The improvement consists in a particular position and action of a spring and loop, and in forming the "hopper" with an incline at the top, so that it may press on the front of the notch after escapement has taken place. The results obtained by these means are considered to be good, being a light and elastic touch, and instant repetition. The inventor, Mr. John Brinsmead, has patented this improvement throughout Europe and America.

Fire from the Sun's Heat. — On Sunday afternoon a fire was observed in the upper part of a dwelling-house, occupied by Lieutenant Sutcliffe, in Park-road, Manningham, near Bradford. A few buckets of water extinguished the fire, which was almost confined to the wooden spouting running under the eaves. The heat sent out for a short time was so intense that a considerable portion of a leaden conductor was melted down. The fire was found to have been caused by the ignition, under the sun's rays, of a couple of sparrow's nests, which were just beneath the Welsh slates.

The National Cottage Hospital for Consumption.—On the 28th instant the Princess Louise will lay, in her Majesty's name, the foundation-stone of the second pair of buildings of the National Cottage Hospital for Consumption and Diseases of the Chest, at Ventnor, Undercliff, Isle of Wight. Nearly 100 noblemen and influential gentlemen interested in the institution are announced as stewards for the ceremony and the luncheon, at which the governor of the Isle of Wight, and president of the hospital, is to preside.

West Derby and Walton Sewerage.—The Home Secretary has at last decided not to sanction the West Derby Board's scheme for discharging their sewage into the river Mersey. He recommends the West Derby and Walton Boards to join and carry out a scheme for utilising the joint sewage, under the provisions of the 1867 Sewage Utilisation Act, "on the broad grounds that sewage should, if possible, be utilised, and that the pollution of even so considerable a stream as the Mersey by the discharge of sewage should be avoided as far as possible." The proposed junction was recommended in the report to the Walton Board by Messrs. Reade & Goodison, on the disposal of the sewage of both townships, nearly eighteen months ago. Both Walton and West Derby are moving in the matter, but West Derby rather unwillingly. It appears from the proceedings of the West Derby authorities that, in consequence of the defective sewerage, Carr-lane has been in a most unsanitary condition for the last twelve months, and there has been fever there. The local health committee are of opinion that the easiest and best plan of remedying the evil, without hardship to the owners, would be to drain in a natural line at the back of the houses in a ditch. The district of the Dog and Gun abounds with nuisances of all sorts. The washing of the clothes of many of the Liverpool people is done in that locality, and fever has thereby been imported into Liverpool. The water is also contaminated, and a well adjoining some wet middens is being sunk deeper, and more poison thereby obtained.

Opening of the Stratford Town-hall.—The new town-hall just completed for the use of the local board and parochial and general officers has been inaugurated by the Lord-Lieutenant of the county, Sir Thomas Western, bart., amid great rejoicings. The building is in the Broadway, the principal thoroughfare. It is Italian in style, freely treated, with statuary surmounting the principal entrance, representing Justice, Mercy, Art, Commerce, Fortitude, and Temperance. Two cupolas rise from the centre of the building, the vane reaching 100 ft. from the ground. The lower portion of the building is rusticated. The entrance-hall is decorated. Over the entrance to the vestibule is a balcony, with red granite pillars. The vestibule is paved with Minton's tesselated pavement, and from the vestibule a wide staircase leads to the upper rooms. The rooms in the basement are devoted to the Local Board of Health, parochial and local purposes, the board-room being decorated. The assembly-room, which can be used for public meetings, entertainments, or vestry meetings, is 50 ft. wide by 75 ft. long, and 30 ft. high, with an orchestra at one end, and an alcove at the other. The decorations were carried out by Mr. Boobinder, in carton pierre. The building contains about 30 rooms, and has been erected from designs supplied by Mr. Lewis Angell, surveyor to the Local Board, and Mr. John Giles, of London. Mr. Ennor is the builder.

Congress of Trade-unions at Birmingham.—The list of papers to be read at the approaching congress of trade societies is being rapidly filled up. The Dublin Association of Trades will contribute a paper on "The Justification of Unionism." The Manchester Trades Council has promised two papers—one on "The Hours of Labour," and another on the question, "How far will Co-operative Production and Industrial Partnerships assist in settling the conflicting Interests of Capital and Labour." Mr. Heath, of the Amalgamated Glass-cutters' Society, will treat on "The Limitation of Apprentices." Mr. A. Walton, Brecon, who represents a large trade association in South Wales, will handle the subject of "The Direct Representation of Labour in the House of Commons." Glasgow, Sheffield, Leeds, and Newcastle will also be represented. The conference will open on the 23rd of next month.

New Church at Highbury.—The foundation-stone of the permanent church of St. Augustin, Highbury New Park, has been laid in the presence of a large assembly, by the vicar of the parish of St. Mary, Islington. The church, which is to be in the Gothic style, will cost 10,000*l.*, and be capable of seating from 1,100 to 1,200 persons. It is being built for the Rev. Gordon Calthrop, who has been labouring for the past five years in a temporary iron church close by the present building. The site on which the building is being erected was given by Mr. Henry Rydon.

Discovery of British Skeletons, Pottery, and Implements, under a Church.—About a month ago it was announced that Sir Tatton Sykes, bart., had razed the old Norman church at Fimber, to erect another in its stead, and that from under the western tower, and from beneath the floor of an earlier church (which seems to have been burnt down) were taken two urns, a flint axe, various flints, animals' bones, &c., leading to the conclusion that both churches had stood upon a tumulus. A day or two ago further finds confirmed this conclusion. At 35 ft. to the east of the urns named was a British skeleton, which the men destroyed. On hearing of this Messrs. Mortimer took up the work, and soon discovered a deeper burnt burial, part of which had also been removed. There were no relics. In going down through the forced clay (previously supposed to be in a natural position, but now found to be full of handstruck flints), Messrs. Mortimer first found in the rubbly chalk beneath the clay the butt-end of a large and finely-formed leaf-shaped arrow-head of black flint. At a depth of 3 ft. into the rock the bottom of an oval grave was reached, on which lay the skeleton of a medium-sized adult in the contracted British fashion, the head being to the north-west. Under the body was a pavement of flat stones. Before the face of the skeleton was a very elegant "food vessel," and above the head were three small flint flakes. The urn is covered by alternate lines of bold cuneiform and herring-bone impressions, which delicate lines of herring-bone work cover the whole interior of the lip. The tumulus being made of clay suggests an origin for the curious meres which yet exist in an undenuded capping of purple clay in Fimber village.

Chatham Dockyard.—At the recent visit of the Society of Engineers to the Chatham Dockyard Extension Works, it was seen that the docks, which are very extensive, are fast rising upon a large tract of marsh, formerly known as St. Mary's Island, which covers an area of about 320 acres, and lies to the north-east of the present yard. The works, when completed, will consist of four graving docks, each of which will be 510 ft. long, 80 ft. wide at the coping, and 41 ft. 6 in. from floor to coping level. They will have 28 ft. 6 in. depth of water at the highest level of the neap tides. There are also three large basins, the combined area of which will be seventy-four acres, and the depth of water in each 30 ft. at high water neap tides. The works are progressing; and the contractor, Mr. A. Gabrielli, expects to complete them by Christmas, 1870, the time stipulated in the contract. In the first dock, the granite flooring is laid, and the sides are built up to half their intended height. The main culvert, in connexion with a pumping-engine, by which the docks will be emptied, is finished. In the second dock, the floor has been laid, and the entrance begun; the third and fourth docks have not yet been commenced. In the first basin, which is called the repairing basin, the walls are in an advanced state, and the river entrance is being made. The entrance from this basin to the second, or factory basin, is also being made, and the walls of the latter basin are being built. The chief object of interest in the yard was the plate-bending furnace, which is heated by liquid fuel on the Dorsett principle. A generator, in which creosote is distilled, is placed near the furnace, and the gaseous product is conveyed by pipes to the furnace, where it is burned in jets.

Petersburg Exhibition. — M. Fontana, architect to the Czar's Ministry of the Household, is charged to construct, on the model of the London Crystal Palace, the building for the exhibition which is to take place at St. Petersburg next year. A sum of 27,000*l.* is allowed for this structure, which is to be completed externally by the 1st of September next, and entirely by the 1st of May, 1870.

Royal Gallery of Illustration. — "No Cards" and "Cox and Box," after 100 representations, are as popular as ever. The present season is drawing to a close, and those who seek refinement with humour, and the enjoyment of delightful music, should not let the opportunity slip by of visiting one of the best entertainments Mr. and Mrs. German Reed have had for many years.

A New Lubricator of Machinery.—Black lead, with which certain parts of pianofortes are lubricated, is now extensively used in Paris as a substitute for oil in the lubrication of machinery. It is said to answer exceedingly well.

Slate Statistics. — The produce of the numerous slate quarries of North Wales is estimated at the present time to be not far from 350,000 tons annually, representing, in money value, about 865,000*l.*, or an average of nearly 2*l.* 10*s.* per ton. The produce is made up as follows:—Festiniog and surrounding veins, 98,000 tons; Penrhyn and surrounding veins, 109,000 tons; Llanberris veins, 75,000 tons; Nantille veins, 40,000 tons; Corris veins, 20,000 tons; making a total of 342,000 tons. The number of hands dependent on quarrying is estimated at 9,400. Of this total the Festiniog veins employ 2,900, Penrhyn 2,500, Llanberris 2,000, Nantille 1,300, and Corris 700.

The Velocipede Movement.—*Le Constitutionnel* announces the production by the combined ingenuity of M. de Cabrieres, an enterprising gentleman, and M. Doirier, an intelligent workman, of a novel description of velocipede. The new vehicle has two wheels in front and one behind. It is worked by the feet and the hands simultaneously, or by either at will. The apparatus is said to be so cleverly constructed, and so perfectly under control, that the new traverser—we can scarcely call it velocipede in this instance—moves with great ease in every direction and stops instantly at will. It is by no means fatiguing to work. The rider is provided with a saddle or little seat, and is not embarrassed with the task of preserving his equilibrium as on a bicycle. We observe, from proceedings in a court of law at Birmingham, that a self-moving traverser has been invented there. This shows the direction that the movement is taking in England.

The Strike at Manchester.—A resolution, bearing upon this strike, has just been come to by representatives of the London and Manchester Bricklayers' Societies, at a meeting held in Sheffield. These representatives, eight in number, were in negotiation, with the view of removing some difficulties between their respective societies, and were assisted by Messrs. W. Allan, D. Guile, and George Odger, of the London Trades' Council, who acted as arbitrators. After disposing of the differences of the two societies, the meeting adopted unanimously the following resolution:—

"That in the interests of both employers and workmen, this meeting recommends that the dispute existing in the bricklaying trade of Manchester should be settled by the following mode:—That a Board of Conciliation be appointed, of an equal number of employers and men, and that a chairman be selected who shall be acceptable to both parties; and that the decision of the Board shall be binding upon both employers and men."

This resolution has given much satisfaction, not only because it affords a prospect of settling an injurious dispute, but also as a recognition generally of arbitration as the best means of adjusting trade disputes.

Unhealthy Dwellings in Newcastle.—At an inquest on the body of a woman who had committed suicide while in a low and despondent state of mind, the coroner remarked that the room and the houses in Cox's Entry, where the deceased and other persons reside, were a disgrace to the owners, and never in the course of his experience had he witnessed such unhealthy dwellings; he was astonished how human beings could exist at all in such places. The jury also expressed themselves in strong terms about the unhealthy state of the dwellings. The verdict returned by the jury was "That the deceased had committed suicide while in an unsound state of mind."

The Market Question.—We hear the Statistical Society proposes, among other more active measures, to engage in the investigation of the markets question in the metropolis; and, at the last meeting, named a deputation, consisting of Mr. Newmarsh and two others, to confer with the record committee of the Society of Arts.

New Hospital at Hanwell.—A new hospital at Hanwell, founded by the Baroness Weld, was solemnly opened by Archbishop Manning last week. The hospital is 49 ft. long by 27 ft. wide. The architect is Mr. Welby Pugin. There were present on the occasion a large number of priests.

Art and Science at the Mansion House. The Right Hon. the Lord Mayor (Jas. C. Lawrence, M.P.) and the Lady Mayoress will entertain the council of the Royal Society, and the members of the Royal Academy, at dinner on Wednesday, the 21st inst., and have invited a large party to meet them.

A Phenomenon in Peru connected with last year's Earthquakes.—On the Locumba road, about twenty-two leagues from Tacna, there exists what is termed a dry *arroyo*, the bed of a former river, into which, from time immemorial, no water has been known to pass. During the earthquakes which destroyed Arica and partly Tacna, the shocks were strongest in the neighbourhood of Locumba and the Arrieros. A mule-driver reported that one of the mountains near the *arroyo* had been split open, and a small stream of fetid water was oozing out of a mountain into the *arroyo*. No attention was at first paid to the fact, nor to the mortality among the animals that visited the neighbourhood. It was only when the people began to leave Tacna, and flee from the scourge of the yellow fever, which was devastating the cities to the Valleo of Locumba, that they became aware of the fatal effects upon their animals, at a distance of as much as eight and ten miles from the *arroyo*:—

"The stench," says an informant, "I can compare to nothing else than old bilge water, of the smell of which you become painfully conscious. Within twelve miles from its source my horse dropped down under me, and in five minutes he was dead. He vomited three or four times a thick black substance, similar in consistency and appearance to the black vomit. I was thus left to walk fifteen miles to the nearest house, two-thirds of which I may call a mules' graveyard, so thickly was the old road covered with them. The cause of this singular freak of nature is unknown; but it seems that the gases which have impregnated the atmosphere produce the vomit and death of the animals that inhale it. What these gases are composed of science alone can solve."

A commission has been ordered by the Peruvian Government to examine into this extraordinary matter and report upon it.

Exhibitions of Bavarian and Foreign Art.—The Munich season promises to be exceptionally brilliant this year; for, in addition to the interesting collections of works of art, there will be three large exhibitions open from the middle of the present month till October—namely, the General International Exhibition of Art in the Crystal Palace, and in connexion with it in the same building the Local Industrial Exhibition; and, thirdly, in the old building for the exhibition of works of art, an exhibition of paintings of the old masters, the property of private persons. The arrangements made by the railway companies to issue circular tickets for thirty days will afford tourists ample time to visit Munich. The National Gallery has been re-arranged by Director Foltz. The large gallery at Schleisheim is also to be re-arranged.

The Pimlico Carpenters and Joiners Classes for Technical Education. — The balance-sheet for the first session, from June 17th, 1868, to May 14th, 1869, just issued, shows, on the side of income, 48*l.* 1*s.* 9*d.*; and on that of expenditure, 45*l.* 4*s.* 10*d.*; giving a balance in hand of 2*l.* 16*s.* 11*d.*

The New Atlantic Telegraph. — The *Great Eastern* has successfully accomplished her task. The cable was cut in order that communication might be made with St. Pierre. The rest of the work was done by the consort ships carrying the shorter lengths of cable. The insulation is said to be "splendid." A message has been telegraphed from the American side to the Emperor, congratulating him on the completion of the work.

Funds of Trade-Unions.—Leave was given to Mr. Bruce to bring in a Bill to protect the funds of trade-unions from embezzlement and misappropriation. The Bill was read a first time, and the second reading fixed for last Thursday.

Staindrop.—The following tenders for the work to be done at the new Wesleyan chapel have been accepted, viz.:—Messrs. Abdale & Stephen, Darlington, mason, plasterer, and slater's work; Mr. J. D. Martin, Darlington, joiner's work; and Mr. George Simpson, Staindrop, plumber, glazier, and painter's work. The chapel will be 41 ft. by 30 ft. inside, and accommodate 218 persons, with provision for enlargement. The architect is Mr. John Ross, of Darlington. The style is Romanesque.

Tudhoe.—The foundation stone of a new church and presbytery, to be called the Church of St. Charles, has been laid at Tudhoe, by the Roman Catholic Bishop of Hexham and Newcastle. The site selected is situated near the village of Tudhoe, and Mr. C. Salvin, of Burn Hall, has contributed 1,000*l.* The contemplated orphanage is for the purpose of gathering together from the entire district the destitute orphan children, and placing them under the direct instruction and supervision of the Roman Catholic community!

Select Supplementary Exhibition.—It is proposed to raise a fund for the purpose of presenting a testimonial to Mr. Moy Thomas in recognition of his disinterested labours, in organising the Supplementary Exhibition of 1869.

TENDERS.

For villa residences, Ravenscourt Park, Hammersmith, for Mr. J. H. Cross. Mr. T. E. Collcutt, architect:—

Taberham	£1,995	0	0
Wilson	1,308	0	0
Goodman	1,335	0	0
Dowel	1,190	0	0
King (accepted)	1,185	0	0

For villa residences, Bevington Manor, Oxford. Mr. T. E. Collcutt, architect. Quantities supplied by Mr. F. Rogers:—

Gray	£2,319	0	0
Cowley	2,200	0	0
Selby	1,920	0	0
T. Jones	1,878	0	0
G. Jones	1,840	0	0
Honour & Castle (accepted)	1,826	0	0
Plumber's Work.			
Taylor	243	0	0
Honour & Castle	160	0	0

For building three cottages at Stratford, for Mr. Peck:—

Gregar (accepted)	£555	0	0

For villa at Grasmere, for the Rev. A. Olivier. Messrs. Brade & Smales, architects:—

Hodgson (accepted)	£1,391	14	0

For repairs to 42, Old Bond-street. Messrs. Mayhew & Knight, architects:—

Saunders	£338	0	0
Bywaters	285	0	0
Rigby	265	0	0

For the erection of two double houses and shops on the London Bridge Estate. Messrs. T. C. Hine & Son, architects:—

Harrison & Son	£7,019	0	0
King & Sons	6,495	0	0
Henshaw	6,490	0	0
Wigmore	6,400	0	0
Crockett	6,300	0	0
Kirk	6,295	0	0
Crabb & Vaughan	6,069	0	0
Morris & Bloomfield	5,915	0	0
Blackmore & Morley	5,910	0	0
Snowball	5,875	0	0
Luxford	5,690	0	0
Stone	5,660	0	0
Perry	5,340	0	0

For erecting a cottage and enlarging coal-shed and meter-house at Keymer, Sussex, for the Keymer and Ditchling Gas Company. Mr. Dallimore, architect:—

Butcher	£339	5	0
Parsons	325	0	0
Norman, W.	316	0	0
Norman, S.	309	0	0
Barnes (accepted)	308	0	0

For new Wesleyan chapel, Abersychan, Monmouthshire. Mr. E. A. Lansdowne, architect:—

Jolliffe (accepted)	£1,250	0	0

For alterations to No. 1, The Grove, Clapham, for Mr. J. A. Eke. Mr. Legg, architect:—

Harrison & Edwards (accepted)	£672	0	0

For alterations to premises, for Messrs. Wilson & Co., Bermondsey. Mr. Legg, architect:—

Harrison & Edwards (accepted)	£320	0	0

For new town-hall, Rickmansworth. Mr. Arthur Allom, architect. Quantities supplied by Mr. W. E. Bagg:—

Clarke	£1,523	0	0
Jones	1,512	13	2
Howard	1,286	0	0
Kirk	1,233	0	0
Hailey	1,209	15	9
Hancock	1,199	10	0
Snowden	1,190	0	0
Cox	1,150	0	0
Blackmore & Morley	1,142	0	0
Bird	1,111	0	0
Brown	1,095	0	0
Wright	1,085	0	0
Gibson	1,077	0	0
Nightingale	1,065	0	0
Goss	992	0	0
Taylor	983	11	7
Holland & Hudson	975	0	0

For alteration to house, 8, Bury-court, St. Mary-axe. Messrs. Young & Son, architects:—

Medhurst	£522	0	0
Howell	507	0	0
King & Son	470	0	0
Merritt & Ashby	439	0	0
Reed & Son	419	0	0
Heeps (accepted)	365	0	0

For alterations to Christ's Chapel, Maida-hill:—

Hackworth	£227	7	0
Ebbs & Sons	223	10	0

For additional school-buildings at the Royal Medical Benevolent College, Epsom. Mr. Geo. Elkington, architect:—

Tarrant	£2,700	0	0
Gammon & Sons	2,697	0	0
Little	2,699	0	0
Hooker	2,178	0	0
Browne & Robinson	2,119	0	0
Wells (accepted)	2,048	0	0

For the erection of a publichouse and warehouse, No. 12, West Smithfield, for Messrs. Lovell & Christmas. Mr. Rawlinson Parkinson, architect. Quantities supplied by Mr. Lansdown:—

Palmer & Son	£4,522	0	0
Deards	4,366	0	0
Foster	4,349	0	0
Patman & Fotheringham	4,245	0	0
Mansfield, Price, & Co.	4,175	0	0
Sewell & Son	3,997	0	0
Newman & Mann	3,996	0	0
Robinson	3,963	0	0
Hill & Sons	3,889	0	0
Morter	3,883	0	0

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Police House at Kew.—We are reminded that both the iron and glass buildings mentioned, in our observations, last week, on the proposed roofing in of the Bristol Exchange, were designed by Mr. Decimus Burton.

J. H. (take proper professional advice. A. would doubtless be liable).—W. C. (name on the block was, of course, the name of the draughtsman who made the drawing on the block).—A. C. (we shall be happy to receive communication, and will give it best consideration).—H. C. (thanks).—W. J. C. L. (the time for examinations is advertised in our columns,—open to all. Details at India Office).—Builder (complete lists of tenders should be sent; not the accepted alone. Nor do we desire tenders that have been delivered months before).—J. B. & Sons.—H.—W. N.—A. C.—R. B. F.—W. G.—R. & S.—T. E. C.—W. S.—J. B.—W. G.—J. D.—Mr. W.—F. G. S.—J. A. D.—L. & M.—C. C. H.—W. R.—H. & Son.—Mr. M.—S. T.—Dr. G.—J. J. B.—J. H. E.—C. F. W.—Messrs. H.—R. M.

We are compelled to decline pointing out books and giving addresses.

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Saffron Walden, July 7th, 1869.

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